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The Cost-Effectiveness of National Training Systems in Developing Countries

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Schools should be responsible for teaching basic skills and the theoretical aspects of vocational training, and employers should be responsible for the practical end — with on-the-job training supplemented in some cases by training at training centers. Institutionalized pre-employment training for entry-level jobs is less cost-effective — despite wishful thinking that it provides an easy solution to the problem of mass youth unemployment.

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Which is better: school-based training (vocational education), center-based training, or on-the-job training (such as apprenticeship schemes)? Controversy about choice of training mode has been aggravated by three factors:

- Failure to recognize that vocational-technical training covers a broad spectrum, from applied science education to job-readiness training. Advocates and critics of a particular training mode who find themselves arguing at cross purposes often have different points of this spectrum in mind.

- Insufficient appreciation of the training that is, or could be, provided — for example, by the private sector in the form of in-service training (apprenticed or otherwise) and training provided by proprietary schools, suppliers of equipment, and other sources.

- A tendency by planners to overestimate greatly the need for extended pre-employment training for entry-level jobs. This bias is reinforced by wishful thinking that training can provide an easy solution to the problem of mass youth unemployment.

Drawing on a comprehensive survey of international experiences and issues, the author concludes that:

- Under favorable conditions (including adequate financing), any training system can be effective. Considering the time and money it takes to execute radical change, it makes more sense to improve the performance of existing training systems than to try replacing them. The design of a training system is not so important as its ability to evolve in light of experience.

- Planners should consider dividing responsibility between schools, employers, and training centers. Schools should be responsible for basic skills and the theoretical end of the vocational training spectrum, and employers should be responsible for the practical end — after the individual has entered the labor force.

- Ideally, for some occupations, employer-trained trainees should attend training centers (which may or may not be schools) part-time to add to their theoretical knowledge — both during initial on-the-job training and later in their working life, as the need arises.

- Full-time institutionalized training aimed at bringing the trainee to job readiness is likely to be less cost-effective for a number of reasons — and in many countries would place an intolerable burden on public funds.

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The review of literature on which this preliminary study is based is continuing. The author would be grateful to receive suggestions regarding additional references, which should be sent to the author in care of:
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1. INTRODUCTION

1.1 The two literatures on training cost-effectiveness

This paper reviews the literature on the cost-effectiveness of different modes of occupational training, focusing primarily on employer-sited training, occupational training within formal education, and out-of-school center-based training.

The literature can be divided into two categories: studies which have attempted to measure in quantitative terms the benefits and costs of different modes of training, and qualitative studies which have examined non-measurable aspects of cost-effectiveness.

The original intention of this review was to focus on the quantitative studies, but this was soon abandoned, for two reasons. First, there is a consensus among experts in the field that many of the critical factors determining cost-effectiveness are qualitative by nature and that to ignore them would be to trivialize an evaluation of this type. Indeed, it may even be the case that the only truly generalizable lessons that can be drawn from the literature relate to the non-measurable aspects. A second reason is that very few of the quantitative studies survive a critical technical appraisal, and virtually all of these are both limited in scope and relate to one country, the United States. The problems besetting the quantitative studies are summarized in the Appendix.

1.2 The training controversy

As those familiar with either literature know, the issue of the cost-effectiveness of different modes of training remains remarkably controversial. There are several reasons for this.

First, training is infinitely more complex and diversified than formal education. Training providers are more heterogeneous and dispersed, course lengths range from hours to years, applications range from the purely manual to the most abstract. In imposing some order on this chaos it is difficult to avoid what Claudio Castro calls the pitfalls of generalization and aggregation, the first being an unwarranted presumption that a particular training arrangement will be equally effective in other contexts (for other occupations, or for the same occupation in other countries), and the second being a tendency to neglect the variety of training provision that is masked by the use of such terms as apprenticeship or vocational education.

A second factor is the interdisciplinary nature of training itself. It involves both technical specialists and economic evaluators and there is so little overlap between their spheres of expertise that a communications gap appears to be the rule rather than the exception. This can be observed all the way from the highest levels of national and international planning agencies right down to the enterprise level, many of the articles in the Training and Development Journal being devoted to advising the beleaguered training director how to justify his budget to management.

At the planning level, the economist's ignorance of production techniques restricts his ability to determine what are practicable alternatives for achieving a training objective and tempts him to oversimplify. The training specialist, on the other hand, tends to be committed to effectiveness rather than cost-effectiveness and unreceptive to alternative training arrangements which lead to an inferior knowledge of theory or diminished job-readiness. Accordingly he frequently has a built-in bias towards institutionalized pre-employment training and is given to simplistic views about financing. The problem of communication is exacerbated by the fact that many training directors and contributors to the literature belong to yet another group, psychologists.

Some writers assert that a third factor underlying the controversy is the existence of a lobby dedicated to preserving and consolidating school-based occupational training, most notably in the United States (Wilms, 1986) and no doubt elsewhere.

Not least, the controversy undoubtedly owes its stamina to the use of vague terminology. In particular, the term "vocational education" is used to cover a wide range of different types of instruction: it is used to describe theoretical and cognitive development with a broad set of applications, like applied science, and narrow training specific to individual occupations, like the training in the metalshops, auto mechanics shops and carpentry shops that have been so popular with donor agencies in developing countries.

Much of the controversy in the literature appears to be attributable to antagonists unwittingly focussing on two different points on what is in effect a continuous spectrum and then arguing at cross-purposes. On the question of providing vocational education in schools, for example, the issue is not whether to provide it, but where to draw the line.

In this paper, for convenience's sake, an attempt is made to divide the spectrum into "theoretical instruction" and "job-readiness training" but it is acknowledged that any such distinction is crude and inherently arbitrary.

The term vocational education is also used to refer to the provision of vocational guidance and preparation for the workplace, which is very elaborate in some countries, as is noted in Section 7.

Since instruction in technical theory, whether undertaken in a school, a training center or an enterprise, may simultaneously be considered to be general education and occupational training, attempts to force a clear distinction between them must lead to further confusion. If a distinction at this level is required, a more useful one is that between general manpower development and specific manpower development (Becker, 1965), with the latter being subdivided into industry-specific manpower development and enterprise-specific manpower development, for this has an immediate bearing on the burden of financing and hence on the allocation of responsibility and, to some extent, location. Although the financing issue is discussed in a companion

paper, Dougherty and Tan (1988), it cannot entirely be separated from the siting issue and the two papers accordingly overlap.

1.3 Criteria of training cost-effectiveness

It should be recognized from the outset that an evaluation of training modes cannot be reduced to a simple discussion of whether one mode is more cost-effective than another, for at least two reasons: there is no single criterion of cost-effectiveness; and in most countries the tremendous diversity of training provision defies easy generalization.

Most evaluations of the cost-effectiveness of training focus on its labor-market effectiveness. In more general evaluations of the effectiveness of training, recognition is given to the importance of other outcomes: the affective aspects, including the attitudes of the trainees to the training programme, its role in bringing them to terms with employment prospects, its effect on their self-esteem, its effect on job satisfaction, and its effect on social values; and the impact on social mobility, equity and sex-stereotyping. But there is no attempt to weigh the benefits of these aspects, or losses associated with them, with the more narrowly-defined economic aspects, even when they are susceptible to measurement.

And yet in some countries these aspects are considered to be of major importance. In the Federal Republic of Germany, for example, providing people, and particularly young people, with status and a stake in society is seen as a major function of the near-universal apprenticeship system for school-leavers. To avoid the threat to social stability implicit in large numbers of young people without a place in society, in times of recession employers voluntarily take on more apprentices than they can employ (Hayes, Anderson and Fonda, 1984). In Brazil, one of the major (and usually unspoken) achievements of SENAI is said to be its ability to tame the work force. In Japan, where the larger firms recruit individuals to the organization rather than for specific occupations, initial training is seen as a means of promoting the identification of the individual with the enterprise. In the United States (Wilms, 1975; National Commission on Secondary Vocational Education, 1984) and France (Prais and Steedman, 1986) one of the benefits ascribed to vocational education is that it caters to those students who have failed in, or have been failed by, general education and who have lost interest in cognitive school work. And in many countries it is expected, often as a matter of wishful thinking, to play a role in lowering occupational aspirations that cannot be attained by most of the labor force.

Even when attention is confined to labor-market effectiveness, multiple criteria are employed: the impact on the productivity as measured by the increase in the trainee's wages; the time taken to obtain employment, and unemployment rates; and the probability of obtaining employment in a training-related occupation, to name but three.

Each of these has its own attendant problems. Training may have both a short term impact on productivity and a longer term effect through enhancing future trainability, and there may be a trade-off between them. The

time taken to find employment, and unemployment rates, may depend as much on the state of the economy as on the effectiveness of the training; and analysis of placement rates typically underestimates the use of transferred skills.

Finally, even when one training mode is being considered in isolation, there remains the danger of falling into the pitfall of aggregation mentioned above - the mistake of underestimating the variety of different types of training provision that may come under a single label, and of treating them as if they formed a homogeneous aggregate. Occupational training is vastly different from general education in this respect.

Even school-based vocational education, arguably the least diversified mode, covers a very broad range, institutions differing both in the range of their offerings and also in the degree to which the timetable is committed to vocational as opposed to general education. And yet one comes across studies which attempt to compute unit costs or even rates of return for vocational education as if it were a homogeneous entity.

1.4 Scope of the review

This review was intended to cover experience in non-agricultural, subprofessional training relevant to policy-making in developing countries. It does however suffer from several biases. In the first place, it has not been possible to avoid leaning rather heavily on the experience of the industrialized countries, for the simple reason that the great majority of the analytical studies, especially those which have been published in the form of books or journal articles and are most readily located by computer-assisted searches of databases, relate to them. Many of the more perceptive and enlightening studies relating to developing countries are hidden away as unpublished conference papers or working papers for government or donor agency reports. They are typically written by practitioners who have no particular interest in wide-scale distribution, they only briefly see the light of day, and they cannot be located by any systematic procedure.

Second, the paper is biased towards industrial training. Again, this was not intentional, but reflects the weight of the literature. Over the past ten years there has been a steadily-increasing interest in the literature on the industrial skill formation in developing countries which parallels an equally sustained level of intervention by both governments and donor agencies. Public administration apart, non-industrial training has attracted less attention.

Third, except where explicitly stated, the paper is confined to conventional versions of the different training modes and makes no attempt to grapple with the details of training technology. This is partly because the choice of technology is usually a matter which may be delegated to the training provider, but partly also because the dissemination of new educational technology is typically very slow and for practical purposes the run-of-the-mill is generally more relevant than the state-of-the-art.

2. TRENDS IN OCCUPATIONAL TRAINING

Since the Second World War occupational training has received increasing attention in policymaking of both national and international agencies. In the 1950s and 1960s the dominant motivation in most countries was the improvement of labor productivity and the promotion of economic growth. While these objectives remain important, they were joined in the 1970s by a concern to minimize the problem of youth unemployment by equipping young people with employable skills.

2.1 The impact of manpower planning

The greatest single impetus to the growth of interest in training undoubtedly came from the manpower planning movement which gathered strength in the late 1950s. Originally this took the form of forecasts of the incremental need for high level manpower derived from detailed employer surveys, the efforts to forecast the demand for scientific and technological manpower in the U.K. in the 1950s and 1960s by this method being a typical example. But it was the version embraced by the OECD in the early 1960s that had the greatest impact (Parnes, 1962). In linking the demand for labor, by occupation, to growth in output and productivity, by sector, it integrated macroeconomic and manpower forecasting and thus provided a basis for manpower planning which was both seemingly scientific and comprehensive. A third variation, promoted by Horowitz, Zymelman and Herrnstadt (1966), used international comparisons to predict the evolution of the occupational structures of different industries.

Irrespective of the methodology used, each of these variations of what has become known as the manpower requirements approach imposes order on the unruly problems involved in manpower planning by treating labor as a commodity, albeit it one with special features. The object of the manpower planner, in this approach, is to predict potential imbalances between supply and demand and eliminate them by intervention on the supply side, "producing" more of the commodity through training. Data were supposedly the key to the quality of the analysis, and the more data the better.

The manpower requirements approach has been discredited in the eyes of most experts, partly because its predictions are invariably too erratic and too aggregated to be useful for decisionmaking (Hollister, 1967; Ahamad and Blaug, 1973), but mostly because it embodies a naive conception of how skilled manpower is created and utilized. Put simply, its central assumption is that productive relationships are fixed and that the labor force must adapt to them. The reality is almost the opposite, it now being well-documented that productive relationships are highly capable of being adapted to a given labor force: tasks may be re-arranged, subdivided and executed more or less rapidly to allow the substitution of one type of labor for another, more or less capital-intensive techniques may be chosen, and product design may be varied, to accommodate the actual profile of labor supply.

In the short run imbalances may occur, but they are typically a minor problem. A more important issue is the gradual moulding of the labor force in a direction which is consistent with the general direction of development and which takes due account of the relative costs of different types of skill development. The new methodology which has replaced the manpower requirements approach is process-orientated and largely data-independent. Understanding the nature of the relationships and flows of information between training providers and employers, and in particular, the working of both open and internal labor markets, is all-important, and interventions are aimed at improving the efficiency of these processes, rather than formulating blueprints or targets (Richter, 1978, 1980, 1982, 1984, 1986; Dougherty, 1983; Hollister, 1983).

Be this as it may, the manpower requirements approach remains remarkably entrenched not only in national planning departments but also in some donor agencies, and it has stimulated the articulation of purposeful, though inherently arbitrary and often misguided, investment policies.

The South Korean experience provides an instructive example. Manpower forecasts have been an important element of each national five-year plan, beginning with the second, and successive disappointments with the predictions have led to the use of an increasingly elaborate methodology. That for the Fourth Plan (1977-81) used an industry/labor classification involving 120 occupations and 53 industrial sectors. The outcome was not an improvement: as Kim (1986) relates, "such a minute detailed disaggregation of occupation by industry could not be fully justified, as we later found tremendous discrepancies between actual numbers and those forecasted." Nevertheless Kim suggests the exercise was a worthwhile undertaking, in that it persuaded the government to initiate various training programmes, and the growth of the economy was so strong that the graduates easily found employment.

In other countries, however, the outcome has been less benign. In Zambia, for example, modern sector employment was predicted to grow by 26% between 1976 and 1983. In fact it fell by 4% and as a consequence the Trades Training Institutes and the Technical Colleges operated at less than half of their capacity during the Fourth Plan period.

With remarkably few exceptions, the investment policies stimulated by manpower planning have embodied two strong biases: they have been addressed to the modern sector, and they have favored the establishment of institutional training facilities, especially technical colleges, polytechnics and non-formal training centers.

In some cases this may be ascribed to the influence of donor agencies, whose comparative advantage lies in the provision of these modes of training: they typically involve substantial expenditure on construction and equipment, which forms the basis for a loan, and they are economical in terms of the burden on donor agency supervision. In fact, until the introduction of sector lending, a relatively recent innovation, it was difficult to conceive of a bankable training project which did not use an institutional mode.

In other cases the biases may reflect a lack of experience of government staff in the relevant department of the national planning agency, often university graduates whose careers have been confined to government service. It is natural that they should give most attention to the more easily visible and comprehensible modes of training, and it is understandable that they should regard enterprise-based training as marginal and unprogressive and delegate supervisory responsibility to the Ministry of Labor.

2.2 The rise of the national training authority

Fifty years ago institutional training provision in many developing countries was limited to a few trade schools and utility-linked facilities, and national training systems could hardly be said to exist. Even in some industrialized countries training remained asystematic. In the United Kingdom, for example, there was no central training authority until the creation of the Manpower Services Commission in 1974, and not even any legislation governing training until 1964.

Now in nearly every country there exists a national authority, typically with the following characteristics: it is attached to the Ministry of Labor, either directly or semi-autonomously; while its policy documents may pay lip-service to the objectives of the national plan, its decision-making is conducted at a much more pragmatic level, being determined by its perception of its potential contribution to the enterprises that comprise its true constituency; and if multilateral agencies have contributed to its development, they have been technical assistance agencies like the ILO rather than funding agencies. As a consequence, it provides an influence which balances that of the national planning agency, its training programmes being designed to complement work experience: courses of short duration intended to upgrade the skills of existing workers, and apprenticeship schemes.

Nowhere has the role of the national training authority been more prominent than in Latin America. SENAI (for industry) and SENAC (for commerce) were established in Brazil as early as 1942 and they have served as a double exemplar for the rest of the region, CONET (under a different name) following in Argentina in 1944, SENA in Colombia in 1957, INCE in Venezuela in 1959, INACAP (under a different name) in Chile in 1960, ARMO in Mexico in 1965, and smaller institutions elsewhere. The nature of the programmes of these bodies has been strongly influenced by the leadership of SENAI and SENAC which, crucially, were established by employer groups to provide communal off-the-job nonformal training facilities for both apprenticeship schemes and skills upgrading. The national training authorities in other countries have been created as a result of state initiatives but have been assigned similar functions.

Elsewhere the development of national authorities has been less dramatic and more diverse. In countries which have recently received independence the process has tended to be more evolutionary and circumscribed by the traditions of the former colonial power. In India and Singapore, for

example, strong apprenticeship systems reflect the previous links with Britain.

2.3 Vocationalization of education as a response to youth unemployment

In most developing countries a rapidly increasing supply of educated labor has posed dilemmas for employment which have no universally agreed solutions. With variations, the following scenario has been repeated many times.

Initially the coverage of primary education is low and that of secondary education even lower. The secondary graduates, who overwhelmingly come from the more affluent families, can expect to continue to university and the primary school graduates will probably find jobs in the modern sector, the quickly growing public sector providing unlimited employment in countries which have recently gained their independence. Soon, with the rate of growth of the public sector diminishing, it becomes evident that higher education cannot continue to expand to accommodate the ever-increasing flood of secondary graduates. There are four engineers for each technician and four doctors for each nurse. It is recognized that henceforward secondary education will be terminal for many, eventually the majority, of its graduates, and the first major policy change is to vocationalize it with a view to providing terminal students with employable skills and in the hope of inducing them to adjust their aspirations downwards.

Thus vocational education is established as a major training mode. In fact it has an ancient history (Foster, 1965) and this is probably not its first appearance. In former colonies its introduction was almost certainly attempted by the foreign power and indignantly rejected by the nationals, who saw it as an overt attempt to impose an educational system with a blatantly discriminatory double standard.

In modern times the vocationalization movement has been given added momentum by the support of the international community. The Outline of a Plan for African Educational Development produced by the Unesco-sponsored Conference of African States on the Development of Education in Africa has been especially influential. Despite the presentation of a background paper by an acknowledged international expert drawing attention to the fact that "many categories of skills are best developed on the job and/or through apprenticeship arrangements. In most countries, all semi-skilled labor and most highly-skilled craftsmen and lower level supervisors can be trained on the job" (Harbison, 1961), the Plan asserted a supposed need for a greater emphasis on vocational education: "... at the second level, increased emphasis should be placed on technical education and on agricultural education. Trained manpower in these two areas is essential to the economic development of African States" (Unesco, 1961b, p.11). The effect was to reinforce the notion that the vocationalization of education is necessary for skill development, rather than one of a number of options.

The vocationalization movement was strengthened by the explicit support given to it by the adoption of the Revised Recommendation concerning

Technical and Vocational Education by Unesco member countries in 1974. This states that traditional education should be adapted through "the diversification of secondary education in the later stages so that it may be pursued in conjunction with employment of training, or may lead to employment or to higher education, thereby offering to all youth educational options corresponding to their needs" (reprinted as an annex to Unesco, 1984a).. In some countries this recommendation has been implemented at the school level, separate academic and vocational schools giving way to diversified secondary schools housing both curricula.

The movement has become increasingly controversial. First, whatever its design, it often encounters massive resistance from parents, who see vocational education as leading to the less-desirable occupations, and from schools which are resistant to change. International experience records many more implementation failures than successes. Second, the basic premise that it can have a positive impact on employment has been questioned. These issues will be discussed in Section 6.

2.4 Recognition of the role of the small-scale enterprise

The problems facing national planners redoubled with the realization that the modern sector was not expanding rapidly enough to provide employment for more than a fraction of educated school leavers, no matter how amenable they are to accepting jobs formerly beneath their status. The one growth area was the teaching force. Elsewhere a lack of resources caused stagnancy in public sector employment, perhaps even retrenchment, despite falling real incomes. The parastatals no longer offered an alternative. Those operating efficiently were increasing their labor forces no more rapidly than the rest of the modern sector. Frustration with low productivity in the remainder led to an exploration of ways to shed labor least painfully.

This predicament has caused both national planners and researchers to pay renewed attention to the employment possibilities outside the modern sector. Given realistic expectations concerning the limited rate of growth of employment in agriculture, the rest of the economy come under special scrutiny, and it was given a name, the informal sector, which made reference to its supposedly unstructured organization and use of simple technology.

In the 1950s and 1960s there was a widespread view that this tri-sectoral classification of economic activity--modern, agricultural and informal--was a useful analytical tool. Hopes for future growth and improvements in the standard of living focused on the modern sector and islands of efficiency in agriculture. The labor required by the growth of the modern sector would be gradually sucked out of the underemployed labor force engaged in much of agriculture. The informal sector was the residual place of employment for those who had lost their roots in the land and had failed to secure employment in the modern sector.

In this scheme the informal sector was regarded as thoroughly marginal, to the point of being a disguise for open unemployment, typical occupations in this view being petty trade and the production of artifacts for

sale to tourists. The optimists regarded it as a temporary phenomenon. The individuals comprising it might never be able to escape from it, for lack of education and skills, but the growth of the modern sector would eventually deny it new entrants and henceforward it would diminish by attrition.

The recognition in the early 1970s that much of the growing labor force would have no alternative than to be consigned to the informal sector happily coincided with the execution of research which painted an altogether different picture of it. The landmark ILO study Employment, Incomes and Equality: A Strategy for Increasing Productive Employment in Kenya, published in 1972, had an especial impact.

This research demonstrated that the informal sector was much more diversified than had popularly been supposed and that much of its activities were anything but marginal. At one extreme one did indeed have the petty vendors and the seasonal production of goods and services by households whose principal activity was farming. But in addition to these one found innumerable small enterprises engaged in construction, the production of clothing and footwear, the processing of food, the production of household and farming equipment, and repairs to all kinds of equipment from automobiles to radios, as well as the inevitable petty services and trade, utilizing equipment which ranged from simple hand-tools to sophisticated power-tools (often rented by the hour), depending on the occupation and the country.

The single most striking finding of the research is that many such activities are the counterparts of similar activities in the industrialized countries and as such an integral part of the economy. It is true that they cater mostly to local needs and hence their scale depends, through a multiplier effect, largely on the consumption expenditure of the recipients of exogenous sources of income--non-subsistence agriculture, public service, other modern sector employment--but this is equally true in the industrialized countries. And of course it is true that productivity is lower than in the industrialized countries, but this may be regarded as a rational adaptation to different factor prices and to the limited scale of local markets in developing countries. If one looks back two or three generations in the developed countries, the differences often disappear.

Not the least impressive aspect of the informal sector is the scale of its contribution to economic activity. In sub-Saharan Africa, for example, enterprises employing fewer than 50 workers account for more than two-thirds of industrial employment, with most of the employment being concentrated in firms employing fewer than 10 (Liedholm and Mead, 1986).

The reassessment of the informal sector has been essentially one of perception, for the activities themselves are typically well-established, stretching back to pre-colonial times in the more traditional ones like blacksmithing. Why were they hidden before?

One answer is that the enterprise survey is often the only reliable source of information concerning economic activity in developing countries and they typically exclude establishments not employing a minimum criterion number of workers. Even if this minimum is set as low as five, it will systematically eliminate the great majority of enterprises in existence. If

the modern sector is defined to consist of those enterprises covered by the survey, the informal sector and its heterogeneity automatically become invisible. The black-out is all the more effective if the coverage of the establishment survey is biased towards the urban sector: in sub-Saharan Africa, the vast majority of small industries are located in rural areas (Liedholm and Mead, 1986).

A second reason is that assessment through direct observation is difficult for those who do not have intimate contact with it. The truly marginal occupations of the street hawker and the shoeshine boy are all too visible, while the more productive activities are hidden away from the main streets and behind closed doors. As the 1972 ILO report put it, "from the vantage point of central Nairobi, with its gleaming skyscrapers, the dwellings and commercial structures of the informal sector look indeed like hovels. For observers surrounded by imported steel, glass and concrete, it requires a leap of the imagination and considerable openness of mind to perceive the informal sector as a sector of thriving economic activity and a source of Kenya's future wealth".

A further reason is that the human mind finds it easier to think in terms of classifications than continue, and prefers classifications with a small number of categories to those with many. Once the dual economy literature had given credence to a modern/informal dichotomy, it was very hard to dislodge.

Why has the reappraisal of the small enterprise been so important? First, it has legitimized efforts to stimulate employment in what is now often known, not as the informal, but as the traditional, sector. For example, the advocates of vocational education now include training for self-employment as well as employment among its objectives. Second, and more importantly, it has stimulated an interest in how skills are developed and passed on in traditional sector.

2.5 Recognition of indigenous apprenticeship

A side-product of the recognition of the role of the small enterprise in many countries was the recognition of the existence of an indigenous apprenticeship system. The first early accounts (for example, Lloyd, 1953; Callaway, 1964; Peil, 1966; Faminu and Koch, 1967; Koll and Lajunji, 1967) were regarded as the work of pioneering explorers, and in a sense they were, but only for the literature on economic development. In retrospect, one may now well ask why anyone did not expect to encounter indigenous apprenticeship as a matter of course. In nearly every society a small proportion of the population has been employed in occupations other than farming and trade, some requiring specialized skills. How else, in the absence of institutional training, could these skills be maintained, except by personal transfer from one generation to the next via some form of apprenticeship? The Western writers were well aware of the centuries-old tradition of apprenticeship in Europe. Did they really not expect to find it equally thriving elsewhere?

It is evident from its ubiquity that apprenticeship establishes itself spontaneously, the chief factors governing any particular manifestation being the formality of the arrangement and customs restricting access. In its simplest form, a youth is trained by a parent or other family member. Next, the coverage is extended to the children of neighbors, and with this come formal agreements, not necessarily written, which provide the master with an incentive for taking on the apprentice and which clarify mutual responsibilities: the length of the training period, conditions for terminating the arrangement, responsibility for upkeep, allowances, and perhaps even fees. Where there are enough craftsmen in the same trade in one locality, autochthonous guilds with elaborate rules may be established (Lloyd, 1953). The final stage is for the state to intervene to regulate apprenticeship arrangements and, in particular, to guard against undue exploitation of the apprentice. Adoptive apprenticeship was regulated by the Code of Hammurabi in Sumerian Babylon more than 4,000 years ago. Why then did its "discovery" in developing countries come as such a surprise?

By the mid-seventies its role as a major form of occupational skill development in many developing countries had been established, often as part of more general research into the traditional sector which also encompassed production techniques and market linkages. Sethuraman (1981) and Hallak and Caillods (1981) are landmark contributions and provide many references. The documentation is now impressive for West and North Africa, and good for parts of Latin America, but it remains patchy elsewhere. Fluitman (1987) and Harper (1987), both published as part of the continuing ILO research programme on the topic, include case studies which broaden the geographical coverage of the literature.

At first there was a tendency to belittle indigenous apprenticeship as a pale shadow of its counterpart in industrialized countries, in much the same way as the contribution of small enterprises to economic activity had been underestimated. Partly this was because, being entirely autonomous, it escaped the attention of national planners who were in any case largely pre-occupied with institutionalized forms of training. Partly it was because, when examined, it could not stand comparison with the modern apprenticeship schemes found in industrialized countries, the skills imparted being relatively narrow and unsophisticated, and unaccompanied by theoretical instruction.

In time however it was recognized that a sharp distinction between indigenous and Western apprenticeship schemes was no more tenable than that between the role of small enterprises in developing and industrialized countries, particularly when set in a historical context. And as in the case of industrial structure, a continuum makes a better organizing framework than a classification: at one extreme one has the passing on of skills from father to son, and at the other one has some highly organized system in Western Europe which guarantee a broad training, make provision for related off-the-job instruction, and guard against the exploitation of the apprentice as cheap labor. The indigenous schemes, which although unregulated by government are typically governed by contract, fall somewhere near the less enlightened ones found in Europe until the middle of this century. In Britain, it should be remembered, there was no official regulation of apprenticeship schemes until

the Industrial Training Act of 1964. Until that date the training could be, and often was, narrow in scope with no provision for day-release for more general instruction.

Official reactions to the revelation of the scale of indigenous apprenticeship systems has varied widely. In many countries, particularly in the early seventies when government finances were less strained and statist attitudes more prevalent, it was viewed as an inferior mode which would eventually be supplanted by government training schemes pitched at a higher level of technical sophistication. It was either tolerated with benign neglect or actively discouraged.

In some countries this attitude persists until this day. In others, two factors have led to a different view. First, caught between a rapidly rising demand for education and training and declining real resources, and noting that training is more expensive than basic education, some governments previously indifferent to apprenticeship schemes have come to appreciate their ability to mobilize training resources. In most cases this new receptiveness is limited to the modern, regulated schemes found in public utilities and large enterprises, but there are also isolated signs of a willingness to explore the possibility of harnessing the contribution of indigenous arrangements, as recommended, for example, by the ILO study of employment in Kenya, a report which in this respect was a little ahead of its time (ILO, 1972, Chapter 14).

The second factor was the concern for the promotion of self-employment. There is now ample evidence that skill-training is but one facilitating factor, and often a minor one. Business know-how is at least important: inputs have to be purchased, credit taken and sometimes given, workers recruited and managed, equipment purchased or hired, and markets secured. The provision of such expertise as a complement to institutional training, whether school-based or nonformal, has often proved to be expensive and ineffective. By contrast, know-how is imparted along with manual skills in apprenticeship, particularly in small enterprises, where the apprentice is expected to turn his hand to everything and run errands as needs dictate.

2.6 Technician training

The previous discussion has focussed on the development of different approaches to craft-level training. Technician training in developing countries has been much more homogeneous, for the most part being incorporated in formal education, and organized on the same principles as the industrialized countries. The main issues have been whether or not to introduce it at the secondary level (and if so, how occupation-specific the curriculum should be), and whether to assign responsibility for the school or institute to the Ministry of Education or to a body more closely associated with future employers of the graduates--for example, another ministry, a professional association or an employers' association.

While the formal training of technicians is the norm, other modes do exist. In Singapore, for example, there are technician apprenticeship schemes

as well as craft ones. And in some countries, the rapid pace of technological change has led to a questioning of the cost-effectiveness of extended pre-employment technical training and an exploration of more flexible, less monolithic arrangements giving greater weight to periodic in-service training. This is an issue which will be discussed in the next section.

2.7 The maturation of training modes

Three trends may be observed worldwide as training systems develop and approach maturity. First, the practical differences between alternative training modes are becoming smaller. Second, training provision is being gradually integrated into a recognizable national system, its coverage becoming more systematic and less subject to duplication. And third, the distinction between pre-employment training and in-service training is becoming less important.

Once upon a time it may have been justifiable to treat school-based vocational education, center-based occupational training, and apprenticeship schemes as if they occupied separate, water-tight compartments.

Certainly it is true that in most countries vocational education used to be a matter for the Ministry of Education, center-based training for the Ministry of Labor, and apprenticeship schemes for employers and the unions, and the programmes differed significantly in orientation, objectives and substance.

But in recent years an increasing recognition of the desirability of combining practical and theoretical training, irrespective of its nominal sponsor, has led to a breaking down of the barriers between the modes, and they are converging to the point where the range of possibilities forms a continuous spectrum rather than a restricted set of isolated alternatives.

Apprenticeships can still be found even in the modern sector of some developing countries in the original form of exclusively employer-sited training. But in Western Europe they typically make provision for day-release or block-release for center-based theoretical instruction, and in some cases they begin with a period of a year or more of full-time center-based training. In Latin America the center-based component is given even greater weight, and in those schemes where trainees are not contracted to employers apprenticeship is indistinguishable from other forms of pre-employment center-based training, except in its duration.

Similarly, secondary vocational education schemes typically include a period of work experience before graduation. There may be a formal partnership with industry, as in the U.S. cooperative education programmes (programmes jointly organized by formal education institutions and employers, with trainees dividing their time between them), and a school may even be company-owned, as in Japan and China (Noah and Middleton, 1988).

At the post-secondary level one finds courses combining several years of polytechnic training with a year of on-the-job training, as in the

sandwich courses in the U.K., where some of the students may be sponsored and financially-supported by enterprises (Jahoda, 1963) and hence enrolled in what amounts to a high-level apprenticeship. A large employer may fund, staff and effectively run a department at a post-secondary technical institute, as does the Zambia Consolidated Copper Mines. Advocates of the mode (for example, National Commission on Secondary Vocational Education, 1984) attach just as much importance to the integration of such programmes with local industry as do advocates of apprenticeship schemes to the need for the provision of complementary theoretical instruction.

In the case of in-service training, vestibule training undertaken by a large firm may be no different in objectives and implementation from the training provided by a group training center established by several small firms too small to support independent facilities. In turn, a group training center may be differ little from an occupational training center serving the entire industry, except that direct financial contributions may be replaced by a levy/grant system and that individual firms have less administrative control. And with the introduction of increasingly sophisticated technology in some industries, an occupational training center may be distinguishable from a formal education polytechnic only in the titles of the certificates issued by it. For example, it may be mostly a matter of historical circumstances whether an institute training higher level petroleum technicians is managed by the Ministry of Education or by the industry, and therefore considered formal or nonformal.

2.8 Integration of national training systems

While the integration of training provision into the national training system advocated by APSDEP (1981) and Ducci (1983) remains a far-off goal in most places, a second consequence of the maturation of training provision in many countries has been a movement towards a division of labor which eliminates both duplication and gaps.

In some countries a key factor behind the breaking down of the barriers has been the willingness of a single institution to support more than one training mode. In particular, the reluctance of institutions of formal education to make their premises and equipment available for occupational training is giving way worldwide as decentralization of authority allows them to respond to local needs and economic pressures provide motivation. One can even cite cases where they have adopted an entrepreneurial spirit, as is the case of those community colleges in the U.S. which provide "start-up" training for new enterprises and 'customized' training for existing ones, in addition to their regular courses.

A second key factor has been the overcoming of the distaste of public officials for implementing public training programmes by subcontracting to private agencies. The Manpower Services Commission in the U.K., for example, has reduced its commitment to direct training in favor of subcontracting, a move which, in addition to eliminating duplication, no doubt reduces its costs and increases its flexibility.

Paradoxically, the creation of a national training system has not required the establishment of a national training authority. Indeed, to the extent that such an authority centralizes decisionmaking and stifles local initiatives, its existence may actually have an adverse effect.

2.9 Lifelong training

Lifelong training is the logical extension of pre-employment training mixed with work experience and one of the motivating factors behind the introduction of modular training was to blur the distinction between pre-employment and in-service training (ILO, 1984).

It has a long history of advocacy (for example, Coombs, 1968), analysis (Stoikov, 1975), and official endorsement by international agencies. For example, the 1974 Unesco Revised Recommendation (reproduced in Unesco, 1984) concerning (Unesco, 1984) Technical and Vocational Education states that technical and vocational education, which are defined broadly, "should exist as part of a system of lifelong education...directed to (a) abolishing barriers between levels and areas of education, between education and employment, and between school and society...(b) improving the quality of life by permitting the individual to expand his intellectual horizons and to acquire and constantly improve professional skills and knowledge ...", emphasis being placed on the creation of "open and flexible educational structures" (Unesco, 1984). On occasion this endorsement has been followed up with practical proposals, an example being that relating to Sri Lanka (ILO, 1971).

Nevertheless lifelong training has tended to be neglected by planners, especially, but not only, in developing countries. Stoikov (1975) reports that the only example of an attempt to introduce explicitly and institutionalize recurrent education at a national level is the 1971 legislation adopted in France.

The outstanding example of lifelong training is its widely-publicized implementation by larger Japanese employers as an element of their lifetime employment policy (Hayes, Anderson and Fonda, 1984).

Elsewhere it has been embraced less steadfastly, the engineering profession providing an example of changing attitudes. At one time the usual route to acceptance by a professional body of engineers in many countries was a gradual process of simultaneously acquiring progressively higher qualifications and experience.

This gradually gave way, in the U.K. for example, to qualification through a pre-employment degree course and subsequent experience.

But now, with the pace of technological change quickening, the pendulum is beginning to swing back. Eurich (1985) notes that "twenty years ago it was observed that the newly graduated engineer was already behind because his textbooks were outdated." A recent U.S. report asserts that "an engineer who does not learn while working now has a useful life in practice of

only 10 years" (National Research Council, 1985, p. 121), a conclusion which is echoed by a British report which suggests that half the knowledge of current electronics engineers will be obsolete within five years (Economist, 1986).

In response the profession is exploring a return to distributed training, albeit starting at a higher initial academic level and for a more pressing motive. A notable example is the report on Lifelong Cooperative Education from the MIT Department of Electrical Engineering and Computer Science (Bruce, Siebert, Smullins and Fano, 1982), proposes measures for what it calls preventive maintenance for engineers, observing that even if obsolescent engineers could be replaced with new graduates, both the human cost and the cost to society would be unacceptable.

The most substantial movement in the direction of lifelong training is to be found in Latin America, where in most countries in-service training is provided by a national training authority. The training is however not primarily a response to the need for skills-renewal caused by technological change, but an effort to bring workers closer to the state of the art in traditional skills and its coverage has been limited: including short courses as well as long ones, 6.1% of the labor force in Brazil, 4.6% in Colombia, and less in other countries, benefited from this type of training in 1973 (Corvalan, 1977).

The Latin American programmes apart, training provision remains heavily weighted to pre-employment training, especially in developing countries (ILO, 1983, p.29), and its type and duration continue to have an overwhelming impact on the life-chances of the individual.

There are two reasons for this. First, national authorities are so preoccupied by the problems of implementing the traditional approach satisfactorily that they lack the resources and the will to explore the scope for replacing it with a life-long approach. Second, pre-employment training is more easily defined and classified and hence correspondingly easier to plan and implement.

The first problem may diminish as the expertise of national authorities develops. The second may eventually be mitigated by the more widespread implementation of modular training. Demand factors are however likely to have a more powerful effect. In many countries it is transparent that for some occupations there is little or no foreseeable demand for new workers but that there is a need for upgrading the performance of existing ones. This is obvious from labor force surveys and confirmed by detailed surveys of employers' views: Kelly and Palmer (1985), Kelly and Evans (1985), Kelly, Evans and Garcia (1985), Kelly (1986a). In theory, although not always in practice, this ought to cause the corresponding training provider to shift from pre-employment to in-service training.

3. TECHNOLOGICAL CHANGE AND THE DEMAND FOR SKILLS

During the past generation automation has increased productivity in most developed countries at an unprecedented rate. It is fashionable to give much of the credit to the introduction of high technology in the form of robotics and other microelectronic systems, but, as Watanabe (1986) points out, this is only part of the story and arguably a marginal one.

The major impulse has come from the growing intensity of worldwide competition and the accompanying need to cut costs and improve quality. In some applications numerical control systems have played a significant role, but effective responses have typically exploited existing technology: the dedicated automation of the production of large batches in discrete manufacturing, incorporating automatic feeders and stoppers, the automation of materials handling, the simplification of product design, and, in the case of capital equipment, redesign to reduce maintenance.

Most of the literature has focused on the reduction in the demand for technically-qualified labor in manufacturing, but it has been equally dramatic elsewhere. For example, in France the introduction of continuously welded steel, together with the development of improved steels and designs for rails and rail clamps, and the replacement of wooden sleepers by concrete ones has resulted in virtually maintenance-free track which lasts for 40 instead of 20 years. As a consequence of these and other improvements, the French railways (SNCF) have been able to reduce the employment of semi-skilled workers from 72,000 in 1965 to 15,000 in 1982, and the employment of unskilled workers from 51,000 to 17,000 over the same period (Gil, 1986).

Except in South East Asia, where output has risen even faster than productivity, the result has been wholesale losses of jobs at the craftsman level and below in production and maintenance. Whether the labor force has been de-skilled, as some have asserted, or up-skilled has depended on the fate of the operator-level workers, whose position has become increasingly precarious. In some cases, especially in the early applications of numerical control, they have been able to take over jobs previously performed by craftsmen, but in more advanced applications of automation their jobs have disappeared as well, leaving behind a much diminished but more highly qualified labor force.

In those countries which had lagged in automation, the current introduction of robotics and other forms of computer numerical control are primarily regarded as labor-saving. In Japan and elsewhere, where surplus labor has already been shed, the saving of labor is confined largely to unpleasant jobs like welding and painting. Otherwise the main impact of the new technology has been the reduction of the minimum economic lot size, and hence the promotion of product diversification and further improvements in output quality.

As a result the demand for highly-skilled workers has been sustained but it has changed in character, nonmanual programming and organizational

skills replacing directly productive skills and narrow trade specialization (Alfthan, 1985).

In the metal trades, for example, an ILO study indicates that technicians will increasingly be engaged in testing and control, maintenance, technical service before and after sale, and research and development (ILO, 1983). Similarly, in her case study of automobile production by Alfa Romeo, Pescarollo (1981) found "a gradual vertical integration of work and a shift towards occupations geared to processes rather than to specific skills: regulation of parameters, quality control, minor maintenance, financial management, etc."

There is widespread evidence that technicians may also be called upon to take over some decision-making formerly considered the responsibility of management, especially in Japan, Germany and other countries where there is by tradition a close relationship between management and the shop floor.

The increases in productivity and the changes in the demand for labor have by no means been independent of the supply of skilled manpower. In Germany, "the plentiful supply of competent labor has made it possible to structure work in such a way that there is need for less supervision and fewer grades in the hierarchy, as well as opportunities for more responsibility at shop floor level than would otherwise be possible." (Hayes, Anderson and Fonda, 1984)

More specifically, a detailed comparison of the metal trades in Germany and the U.K., Daly, Hitchens and Wagner (1985), ascribes the higher productivity in German firms to the superior level of the training of shopfloor workers, particularly that of the foremen, who in Germany would typically have an advanced craft qualification, unlike their British counterparts. They found that this had two effects which are bound together. It enables the German workforce to use any given type of equipment more productively--the technical capabilities of machines were more fully exploited, abuses were less likely to occur, faults were more likely to be diagnosed correctly and rectified in-house. The second effect was that as a consequence management was willing to install more advanced equipment. The average age of the U.K. machinery appeared similar to that in the German firms, but it was less sophisticated. In part this reflected a lack of awareness of technical possibilities, British management also having a significantly inferior level of technical training than their German counterparts, but in part it was attributable to an apparently justified fear that the workforce would experience difficulties in maintaining more complicated equipment and using it effectively.

It is perhaps this X-efficiency effect which is most relevant in most developing countries, for the changes in the state of the art have had greatest impact in the industrialized countries, and then in the larger firms. In the rest of the world their effects have typically been confined to those parts of the economy exposed to international competition, that is, to the few enclaves of production of manufactures or processed goods for export. The cheapness of labor, the small size of domestic markets, the willingness of consumers to tolerate compromises on quality and the relatively relaxed

domestic competition conspire to insulate the production of non-traded goods and services from the new technology.

In contrast, there is evidently much scope in most developing countries for using existing technology more productively. For example, Kelly (1986a) concludes that "studies around the world suggest that there is little evidence of specific skill shortages in most developing countries and yet employers constantly complain about low productivity levels. Further analysis suggests three essential conclusions regarding this topic:

- (i) The problem seems less a quantitative shortage of specific skills, more a qualitative lack of motivation and performance. The job gets done, eventually, but not well.
- (ii) In response to this problem, employers take a variety of compensating actions. They break tasks into simple components, they overstaff, they build in assumed delays into production scheduling, and so forth.
- (iii) These compensatory actions raise production costs, thus lowering production efficiency even while promoting distributional efficiency.

Whatever, the problem is not likely to be solved by further increases in traditional training programmes unless they are able to impart a "sense of commitment to work" or a "work ethic". Better education, better structuring of remuneration systems, and better management are likely to be more effective tools than more traditional training programmes."

In the industrialized countries, new and old, it is generally accepted that changing technology will increasingly require the development of cognitive rather than manual skills in industrial training. In most developing countries, however, Kelly's conclusions suggest that there is ample scope for improvement in both, and if there is a relevant trade-off, it is between the quality of training provision, and the numbers trained, with quality requiring greater priority than has been accorded in the past. While special provision is made for those types of training where approximation to the state of the art is important, the lower pressure to automate will assure a continued survival of the existing structure of the labor force, and hence of conventional training objectives.

4. FACTORS DETERMINING COST-EFFECTIVENESS

4.1 Introduction

There appears to be a consensus in the literature that the major factors determining the cost-effectiveness of a training system are:

- (i) The speed and flexibility with which the training system responds to changes in training needs.
- (ii) Economies and diseconomies of scale.
- (iii) Selection of trainees.
- (iv) Quality of training inputs.
- (v) The provision of work experience during training.
- (vi) Accountability of both training provider and trainee.
- (vii) Placement of trainees

In addition, there is agreement that there are preconditions which must be fulfilled if any training mode is to be cost-effective: in the case of entry-level occupations, macroeconomic unemployment should not have eliminated the market for trained personnel; there must be an adequate industrial base if an apprenticeship system is to thrive; and necessary supporting measures must not be neglected when a new mode is introduced or an existing one subjected to a major reform.

Finally, and not least for policy purposes, the importance of the initial conditions and cultural factors should be stressed. It may be better both in economic and social terms, as well as less risky, to make marginal improvements to a suboptimal training system than to attempt to replace it with one which is theoretically superior. To put it in the language of cost-benefit analysis, the cost of the required investment, together with the loss of output during the transition period, should not outweigh the present value of the future gain at an acceptable discount rate. For this reason alone one cannot expect the cost-effectiveness criterion, even if handled narrowly, to yield a universal prescription for the design of a training system.

4.2 Speed and flexibility of response to training needs

Cost-effectiveness analysis tends to focus on the static aspects of resource allocation for the simple reason that these are more susceptible to conceptualization and measurement than the dynamic ones. Nevertheless the less tangible dynamic aspects are also critical, and a training system capable of adapting rapidly and flexibly to changes in the labor markets may be more cost-effective than one which apparently makes better use of resources in the short run.

The keys to flexible and responsive systems are: (a) an orientation of the national planning authority towards decentralized decision-making, (b) the existence of links between training providers and employers, either in the form of direct association or through dissemination of appropriate and up-to-date labor market information, and (c) the ability of training providers to adapt the volume and curricula of their programmes in response to signals from employers or the labor market.

Need for decentralized decision-making

There are three reasons why it is important that a national planning authority adopt a decentralized approach to detailed decision-making concerning the provision of training.

First, it is utterly unrealistic to expect a central agency with finite staff to be able to monitor the myriad varieties of training that exist in most countries. Information processing is expensive and since it is subject to sharply diminishing returns, the point is soon reached where other activities have a higher claim on resources.

Second, with limited experience and expertise, the staff of a national agency are less well qualified to take training-related decisions than those directly involved, the staff of the training providers and the employers of the trained. They are recruited for their analytical and administrative abilities and it is much more important that they should have a good general understanding of how education, occupational training and employment are interrelated than that they should have detailed knowledge of the specifics of training for a particular occupation.

In practice, in developed as well as developing countries, even the general understanding is frequently lacking. For example, a thorough study of training provision in New York City states, among its conclusions, that "an unavoidable one is that at the highest policy levels, whether legislative or administrative, there is a critical lack of awareness of how complex the labor market really is." (Lynton et. al., 1979, p. 289). This observation applies worldwide, and to donor agencies as well as governments.

Third, centralized decision-making is generally implemented more clumsily, slowly and expensively than decisions made on the spot. The inevitable filtering of information transmitted to the central agency undermines the capability of national staff to devise the most appropriate policy, and it takes time and costs money to gather the information that is transmitted.

The conclusions of a recent World Bank survey of training institutions in the Middle East are representative in this respect. It found that highly centralized systems suffered from a lack of flexibility in response to change, particularly in local labor market areas in the larger countries; that educational resources were being used inefficiently, partly because communications were slow, but more importantly, because decisions were not being taken by those best placed to take them; that directors and

teachers tended to suffer from a lack of motivation and inability to identify with the goals of the system; and that there was little incentive to improve efficiency and contain costs (World Bank, 1986, and supporting documents).

Links between training providers and employers

The dynamic efficiency of a training system depends on the availability of signals indicating desirable changes. At one time it was thought that the most appropriate methodology was the estimation of training needs derived from long-term projections of manpower requirements. However, even in local labor markets complete reversals in particular industries can occur suddenly and with little warning (Lynton *et. al.*, 1979, referring to New York City) and long experience has shown that such projections are virtually worthless for planning purposes (Ahamad and Blaug, 1973; Hinchliffe and Youdi, 1985).

There is now a consensus that, for most types of manpower development, it is impossible to improve upon short-term planning techniques using heterogeneous forms of labor market information (see, for example, Richter, 1978, 1980, 1982, 1984, 1986; Dougherty, 1983; Hollister, 1984; Kelly, 1986a, 1986b). Although short-term planning avoids the major errors associated with its longer-term counterpart, it too involves errors in the volume, nature and timing of training and the objective of planners is to minimize these errors by both responding flexibly and quickly to appropriate signals, and by paying special attention to the anticipation of turning points.

An essential element of short-term planning is the establishment of close, permanently-institutionalized links between training providers and employers, or employers' associations (Squire, 1981; Dougherty, 1983; Herschbach, 1985; Herschbach, Reinhart, Darcy and Sanguinety, 1985; Kelly and Evans, 1985; Kelly, Evans and Garcia, 1985; World Bank, 1986; Noah and Middleton, 1988). The contact should at least provide valuable feedback information to the training provider and assist in the placement of its graduates. It may also generate resources.

Adaptability of training providers

The dynamic efficiency of a training system depends not only on the generation of signals reflecting the demand for skilled labor but also on the ability and willingness of training providers to respond to them aptly and quickly. This in turn depends upon the autonomy of the training provider discussed above, the adaptability of the curriculum, training personnel and equipment.

Modular Training Schemes

The curriculum rigidity problem may to some extent be overcome by the use of a modular training system. In the first place the modular approach makes it necessary only to replace outdated subcomponents of a course rather than to review the course as a whole.

Second, in a training system where a given module may be a component of several different courses, the replacement of an outdated module ensures that all affected courses are upgraded systematically. This is one of the potential strengths of the fine-textured ILO approach, where occupational training programmes are broken down into modules of employable skill, and these in turn are broken down into training units which may be common to several modules, and of the V-TECS approach, both of which are based on task-analysis (ILO, 1973, 1984).

Third, modularization permits individuals to customize their training to some extent and hence respond to changing patterns in the demand for skills. This flexibility is enhanced by the fact that the training design follows the cluster principle (see, for example, Ma'ley, 1975) in which the introductory modules are typically broad-based and common to a number of related occupations, subsequent ones becoming progressively more occupation-specific, with the consequence that the trainee can postpone making a commitment to a particular occupation until he has completed a substantial part of the training.

Innovation

In addition to responding promptly and flexibly to changes in the demands placed upon it, it is important that a training system should be capable of acting as a conduit for innovation. In this respect both institutionalized and employer-based training have their strengths and weaknesses.

4.3 Economies of scale

A donor agency recently received a request to support the introduction of a training scheme for lift technicians in a Sub-Saharan African country. On investigation it transpired that the country possessed precisely one lift. This is an extreme example, but the fact of the matter is that there is surprisingly little interest in systematically monitoring unit costs in both public and private training schemes, in developing and developed countries alike, and hence there is a lack of awareness of the possible trade-offs for different types of education and training, given a fixed budget.

Typically such unit cost studies as do exist have been undertaken on an ad-hoc basis by consultants or researchers and they are limited to evaluating how much more one type of training costs than another type at a similar level.

The direct unit costs (not including administrative and boarding overheads), and hence cost-effectiveness, of a training scheme automatically depend on two factors: the cost of acquiring the services of an appropriate instructor and facilities, and the intensiveness with which these services are utilized.

The first factor causes the cost of occupational training to be approximately twice that of non-technical training in center-based or school-

based schemes, because instructor cost is doubled and workshop training usually takes place in half-size classes. The cost of the specialized facilities normally has only a relatively small additional effect (but there are exceptions, for example secondary vocational education in Kenya: Lauglo, 1985).

The real reason that occupational training is often so much more expensive than non-technical training is that it is difficult to secure efficient utilization of the instructor and facilities. There may simply not be a sufficient number of potential trainees living within travelling distance, or adequate demand for graduates by employers.

The first problem may to some extent be resolved by making the training episodic or residential, but in the latter case the gain achieved by eliminating underutilization may be absorbed by the cost of providing boarding facilities, and this may be very substantial.

The second problem may be less tractable. If the national demand for a particular type of training is insufficient to support efficient training provision, it may be worth establishing a center which would serve regional needs. The remaining alternative is to make use of facilities available abroad.

In contrast to center-based or school-based training, apprenticeship schemes and other forms of on-the-job training may be relatively efficient at low volumes of training and inefficient or even impractical at high ones, for reasons discussed in Section 5.2.

4.4 Selection of trainees

Failure to select trainees for motivation and aptitude can have a significant negative impact on both the internal and external efficiency of a training mode, contributing to high drop-out rates and a failure of graduates to seek training-related occupations. For obvious reasons, selection is less likely to be an important issue for in-service training than for pre-employment training.

In the latter case, much selection is self-selection and heavily dependent on guidance. The value of guidance is reflected in the statements of principle issued by leading international agencies. For example, the 1974 UNESCO Revised Recommendation concerning Technical and Vocational Education (reproduced in Unesco, 1984) and the 1975 ILO Recommendation concerning Vocational Guidance and Vocational Training in the Development of Human Resources (Recommendation 150) both devote one section to guidance and part of another to guidance staff. The 1975 ILO Convention concerning Vocational Guidance and Vocational Training in the Development of Human Resources (Convention 142) devotes two articles to guidance.

This is one issue where statements of principle have been preceded by implementation, for provision of guidance is a long-established practice in many national school systems. It is regarded as being in the interest of both

the individual and employers, playing a critical role in the self-selection of trainees, enhancing their motivation and ability to use the training productively, preparing them for the rigors of industrial discipline, and helping them locate, obtain and keep appropriate jobs. As such it is complementary with skill development, amplifying or nullifying its effects on employability.

In some contexts the characteristics promoted by guidance may be the dominant factor in determining employability. For example, Thurow (1979) reports that "during the height of the war on poverty [in the U.S.] it was a common observation of those employers who were making a good-faith effort to train disadvantaged workers that it was easy to teach cognitive job skills (how to run the machine), but next to impossible to teach good work habits (show up on time, do not cuss the boss, work hard, etc.) Since poor work habits tended to drive out good work habits, employers found that the poor work habits, if tolerated, spread to the rest of the labor force. Hence some firms even went so far as to establish what were essentially entry factories to provide a place for teaching good work habits where the teaching would not corrupt the rest of the labor force. In general this is such an expensive way to teach good work habits, or to determine who has good work habits, that few employers are willing to use it in any wholesale way. Most of the employers who had such training plants in the 1960's have in fact abandoned them as too expensive."

4.5 Quality of training inputs

The effectiveness of training obviously depends in great measure on the adequacy of the budget allocated to it and the quality of the inputs purchased. In concrete terms, it depends on the occupation-specific and pedagogical skills of the instructors, on the equipment used for training and on the consumables provided. The heterogeneity of experience in this respect cannot be too strongly emphasized: the quality of inputs may vary substantially within a given training mode in a single country. But as a general tendency the problem of assuring input quality tends to be greatest for institutional pre-employment training, both nonformal and formal, partly because it is often more ambitious in scope than enterprise-based training, but partly because institutional training appears to be inherently more vulnerable. The issues are discussed in the section on nonformal training, but they apply almost equally to school-based training.

4.6 Provision of work-experience during training

It is now universally accepted that in many types of entry-level training the inclusion of a period of work experience confers a wide range of desirable benefits:

It develops the practical skills of the trainee.

It improves trainees' career awareness and their ability to self-select (Wilson, 1978).

It improves trainees' appreciation of the value of their education, and their motivation to study, after exposure to work experience (Forrester, 1967; Wilson, 1978; Center for Public Resources, 1982).

It assists teachers in targeting complementary skill-development in the schools (Center for Public Resources, 1982)

It facilitates the transition from school to work by allowing trainees to observe the differences between classroom instruction and actual practice and by improving their understanding of the demands of the actual job (Reubens, 1982).

It provides future job contacts for the students.

It may be a significant source of income for the students (Wilson, 1978).

In addition to these specific benefits there is the general benefit of strengthening links between the training provider and employers, perhaps the most important benefit of all.

4.7 Accountability

It goes without saying that the effectiveness of training is critically dependent on the accountability of both the training provider and the trainee. The existence and effectiveness of incentives for both to discharge their roles are discussed in the sections addressed to the different training modes.

One issue which cuts across training modes is the impact of certification on both the performance of training providers and trainees. While it can have dysfunctional effects on training schemes, the official endorsement of certification by international agencies and the increasing scope of its implementation in developing as well as developed countries bear witness to the consensus that it has a beneficial effect on skill development. The efficient working of both the German dual system and the French vocational education is attributed in part to the existence of complex national certification systems (Prais and Wagner, 1983; Prais and Steedman, 1986).

The most obvious impact of certification is on labor markets, in that, in principle at least, it reduces the hiring costs of employers. It also increases the marketability, and hence value, of skills and thus improves one incentive for trainees. The enhancement of job mobility can, however, have a dysfunctional effect on the provision of training by a particular employer. An example is provided by a 1986 donor agency report which states that more than three-quarters of graduate teachers trained in Zambia during the period 1974-80 remained in teaching for only a token period and then used their degrees to obtain jobs outside the profession. To counter this problem

a European Community in-service teacher training scheme aimed at raising standards in Zambia will not offer formal equivalency qualifications.

A second benefit of certification is its potential effect on raising training standards. Post-tests are regarded as effective stimulants for both trainees and training institutions, setting performance targets for individuals and providing a means of monitoring the quality of the training output.

Third, certification permits the introduction of flexible training arrangements, allowing training to be modular instead of time-serving and mixed with general education without losing its independent value. In many countries modular arrangements are replacing, or have replaced, traditional time-serving apprenticeships, with savings both of training time and opportunity costs. In the U.K., for example, the prospect of achieving a substantial reduction in the five-year training period was a major impulse behind the replacement of the time-serving apprenticeship in the engineering industry with a modular, certified system (Swinden, 1968). The modules of 25-75 hours now typical of much in-center training in Latin America make it possible for the trainee to combine the training with continued full-time employment.

Fourth, the introduction of certification is sometimes advocated on the ground that it can play a role in integrating the different modes of training into a coherent national system in which the "negative consequences of selection and differentiation could be reduced and hopefully, possibilities for widening opportunities increased" (Smith, 1986), an example being the alternative routes of apprenticeship and secondary vocational education to the Certificat d'Aptitude Professionnelle taken by roughly equal numbers in the building trades in France (Prais and Steedman, 1986).

Quite apart from the dysfunctional aspects noted, there are clear limits to the cost-effectiveness of certification. Particularly in the more developed countries technological change is raising the cost of maintaining a certification scheme by increasing the need for up-dating. At the same time it is making certification more difficult by broadening the range of skills required by vocational and technical occupations and increasing the cognitive content of skill development at the expense of manual skills. And everywhere there is the problem of enforcing test standards. One recent report disarmingly states that "the Trade Testing system is not highly regarded because a breakdown tends to occur in the application of standards during test administration" (Somalia Ministry of National Planning, 1984, p. 8-38).

4.8 Placement

The cost-effectiveness of certain types of pre-employment training may be adversely affected by a failure of the graduates to enter training-related occupations. Sometimes this is merely the consequence of some other aspect of the training process as, for example, in those cases where employers are so disenchanted with the quality of the training or the attitudes of the graduates that they prefer to train on-the-job.

Sometimes, however, placement failure may be caused by insufficient demand for the graduates. This is particularly a problem with extended institutional pre-employment training and even with apprenticeship and it brings up the manpower planning issues described in Section 2 and again in the discussion of links between training providers and employers in this section.

Sometimes placement failure may be caused by graduates not taking up training-related employment of their own volition, or taking it up on a short-term basis. Again, this is a common problem with pre-employment training and especially with school-based training. This problem and its implications are discussed in Section 7, which also examines the view that the waste caused by placement failure may be mitigated by a transfer of the broader benefits of training.

4.9 Cultural factors

Cultural factors alone will ensure that there can never be a global answer to the question of what is the optimal choice, or mix, of training modes. They both influence the objectives of training and are responsible for constraints on its provision.

Objectives

The cost-effectiveness of training depends not only on its ability to impart skills but also on its effects on the attitudes and values of the trained. Three issues in particular have received attention in the literature.

First, there is the effect of the training on the individual's choice of occupation. There is a consensus that in general, the greater the academic content of the training, the less likely is the individual to enter a vocational or technical occupation. Thus although it may be true that, for some occupations, a combination of general education and in-firm training may both be cheaper than alternatives involving vocational education and impart superior adaptability, it may have a negative effect on the supply of individuals entering technical occupations, both in terms of quantity and quality.

This consideration has, rightly or wrongly, nearly always been used in the justification of the vocationalization of primary and secondary education, first in the agricultural vocational education schemes and later in other forms. Early ideas that vocationalization was a sufficient condition for affecting occupational choice have been shown to be misguided, and it is now recognized that it needs to be accompanied by concomitant changes in teacher attitudes, examination procedures, admission procedures to institutions offering further education or training, and recruitment criteria for entry-level jobs. Even then efforts to channel students into vocational or technical occupations will be fruitless if labor market forces and administrative practices conspire to make them less well paid, less secure and of lower status than other occupations (Dodd, 1968; Heyneman, 1971).

Second, there is the effect of type of training on expectations. It is common to find that those who follow a general education path and convert to technical occupations have less realistic expectations about salaries and promotion rates than those who have received vocational education or served apprenticeships.

Third, there is the effect on work attitudes and behavior: respect for organizational goals and rules, sense of responsibility and personal discipline, ability to collaborate with co-workers, attention to detail and punctuality. Again, it appears that the closer the training is to the workplace and employer, the more likely it is that these objectives will be achieved. A significant achievement of SENAI and SENAC in Brazil is their ability to instil these attributes into the workforce.

Constraints

Cultural factors affect the social acceptability of training schemes and may even have a decisive influence on which mode becomes dominant. For example, Reubens (1982) reports that fear, on the part of both unions and politicians, of apprenticeship schemes being too firm-specific and restricting occupational mobility has been a major impetus to the development of vocational education in Sweden. Swanson (1982) accounts for the early U.S. adoption of the vocational education route in the same terms. In Japan, by contrast, there is competition to enter employment which effectively binds an individual to a single employer for life.

4.10 Preconditions

Demand for skilled manpower

In general, training schemes cannot be expected to be cost-effective when there exists widespread unemployment and it is unrealistic to expect that they can provide a cure for unemployment caused by macroeconomic factors. A typical and recent example of this view is provided by the terms of reference of the National Working Group, established in 1984, of the All India Council for Technical Education, which suggest that vocationalization can provide a solution to mass unemployment (Sacheti and Ray, 1986).

Whatever the rhetoric about equipping school-leavers for work, the mass youth training schemes current in some European countries have clearly been introduced primarily for social reasons, the objective being to keep the trainees actively occupied at relatively low public cost, the public subsidy being offset by a saving on unemployment benefits.

Two types of training may nevertheless be justifiable even in these circumstances. One is the upgrading of the skills of those already in the labor force. In Zambia, for example, employment in the modern sector has remained constant for a decade and is unlikely to expand significantly in the near future. The informal sector has limited employment opportunities for technicians and it is clear that there is little justification at present for

entry-level training on the present scale. Yet a 1986 donor agency report concludes that there is clearly very considerable scope for improving the efficiency of those already in employment and a corresponding role for the training providers.

The other is more controversial and difficult to evaluate in terms of cost-effectiveness. It is frequently argued that industrialization can be encouraged by the prior establishment of a trained labor force. The success of Taiwan, Singapore, South Korea and Hong Kong is sometimes attributed to the role of the secondary vocational schools in providing technically-qualified labor. Malaysia, which has hitherto attracted overseas enterprises employing relatively unskilled labor, is now planning to train ahead with the aim of attracting industry with more sophisticated requirements.

There does not appear to be any study of the cost-effectiveness of this chicken-and-egg process, but it is reasonable to suppose that the case is stronger for school-based general technical education than for job-readiness training, school-based or otherwise. Many studies have shown that skills tend to be lost if not used immediately, and the deterioration is most rapid, the more specific the training.

Further, there is little evidence that there is any need for speculative training-in-advance. As is described in Section 8, job-readiness training can normally be provided as "start-up" training in real time, that is, during the construction of the physical facilities. The existence of a service unit on the lines of the start-up units that have been established in several states in the U.S. (Brooks, 1976) which can help to organize, and perhaps subsidize, real-time training, is likely to be more attractive to an incoming enterprise than the prior existence of a stock of workers with imperfectly appropriate and decaying skills.

General education

Most forms of occupational training demand certain prerequisites in terms of literacy, and the quantitative and communicative skills provided by general education, and it cannot be expected to be cost-effective if these requirements are ignored. Even in the United States this is recognized as a potential problem, with lower achievers being guided to precisely that track which is least likely to provide the support they most need. As the Committee for Economic Development (1985) puts it, "students who are poorly prepared academically by the time they reach high school frequently need substantial remedial work, which too often is provided by vocational instructors who are ill-equipped for that demanding task."

Supporting measures for new modes

Experience has repeatedly shown that the cost-effectiveness of a training mode may be jeopardized by a failure to provide sufficient resources and complementary inputs at the time of its introduction.

Apprenticeship schemes tend to become marginalized if not supported by an effective supervisory board capable of monitoring the implementation of regulations and updating the curricula as circumstances change.

Vocational education schemes can fail for many reasons, quite apart from a lack of parental or school authority support. The Sri Lanka Pre-Vocational Education Initiative of 1972 failed because there was no central curriculum design, the schools being left to their own devices (Wijemanna, 1986). Vocational instructors may not be trained. Equipment may lie indefinitely at the central depot because staff do not know the procedures for distributing it: "Dilatoriness has aggravated the shortage of training materials. Centrally procured material has remained in store for long periods, apparently because staff engaged in supply of material do not know how to proceed after receipt of the material. Staff generally are reluctant to sign receipts and take responsibility for material received at training sections. They appear to need training in the performance of these tasks" (restricted 1986 donor agency report). Equally, it may be distributed but then left in its packing cases for years for lack of installation expertise, as in Sierra Leone (Wright, 1986) and numerous instances elsewhere.

Not least, adequate support must be given to graduates to establish themselves in the occupation for which they have trained. The success of the Costa Rican public workshop training for self-employment scheme is attributed to the fact that the trainees receive support from cooperative organizations, marketing boards, and credit institutions. Conversely the failure of agricultural vocational schemes may in part be attributed to a lack of attention to the problems encountered by young people in acquiring and establishing themselves on the land. Dodd's (1969) account of the failure of the 1952 Tanzanian agricultural programme remains relevant for those states which hope to find employment on the land for their hitherto exploding populations.

The fact that a mode of training has performed unsatisfactorily in a given country at a given time does not necessarily mean that it is intrinsically flawed, since there is nearly always the possibility of shifting the blame to shortcomings in its implementation. But for the same token one is entitled to ask whether one mode is inherently more fragile than another, more susceptible to the risk of poor implementation. The greater dependency of a mode on unreliable sources of finance or on thinly-stretched management, the more vulnerable it must be.

This is one reason for not being too hasty to excuse the failure of public institutionalized training projects. For those projects prepared and executed with donor agency assistance, there is another. As Herschbach (1985) observes, the participation of donor agencies, and the resources provided by them, are almost invariably limited to the establishment of training provision. The risks attached to the project automatically increase with the cessation of this support.

5. ENTERPRISE-BASED TRAINING

5.1 Types of enterprise-based training

The term enterprise-based training is used here to denote all forms of training for which the enterprise takes responsibility. The actual training may take place at the work-place (on the production line, in the office, on the ward), in which case it will be described as on-the-job training; it may take place at the work place in dedicated facilities (workshops or classrooms), in which case it will be described as vestibule training; or it may take place in off-site facilities, typically a nonformal training center, a technical institute, or a proprietary school. The reason for including the off-site training components here, rather than leaving them to the next two sections, is that they tend to have a different impact when the trainee is employer-sponsored than when he is not.

Surveys in most countries show that the great majority of training programmes fall into two categories: short courses of less than six months' duration, usually much less, and longer, structured, programmes primarily aimed at entry-level workers. The former will be called ad-hoc training and the latter apprenticeships.

The term apprenticeship may conjure up an image of a young person undergoing pre-employment training of three to five-year duration, with day-release to a training center for more general instruction, the training scheme being broad-based in nature and supervised by some national body under legislation following an ILO model.

Such a conception is much too narrow and the customary restriction of the definition of apprenticeship to this ideal model has the damaging effect of causing national policymaking to overlook other forms of practical entry-level training which belong in spirit to the same category, most notably the apprenticeship systems in the traditional sector whose "discovery" was noted in Section 2, but also the structured entry-level training for occupations not covered by ILO-style legislation or explicit master-apprentice contracts, for example, for the health professions, accountancy, and the specialized technical occupations in electricity generation and distribution and telecommunications in countries where apprenticeship "does not exist". The three types of apprenticeship, which are treated separately below, will for convenience be termed regulated, indigenous and de facto.

5.2 Ad-hoc enterprise-based training: strengths and weaknesses

Ad-hoc training in its various forms--on-the-job, vestibule and off-site--constitutes the most important form of manpower development after general education and its cost-effectiveness is generally least open to doubt. There are usually no problems with the selection and placement of trainees, and there is no need to make a special provision for work experience, with the quality of training inputs. Except in moribund private enterprises or the more insulated parastatals, ad-hoc training can be expected to have the following strengths and weaknesses:

Speed and flexibility of response to training needs

Except possibly in some large-scale vestibule training programmes, ad-hoc enterprise-based training does not suffer from the problems of overly-centralized decision-making, or the imperfect links between trainer and employer, that tend to afflict institution-based training.

Adaptability

Since trainers and training equipment can often be borrowed from production and returned to it according to need, the provision of such training is flexible. Furthermore, the flexibility is operational: there is little risk of an ad-hoc course outlasting its need and surviving autonomously. Indeed it is not uncommon in larger firms to find that change is taken for granted, training being organized in cycles beginning with the development of a fresh curriculum and materials. The issue facing the training designer is not whether but when the new system will have to be replaced in turn and what initial development investment would be most cost-effective (Kearsley and Compton, 1981).

Innovation

Employer-based training is criticized for perpetuating obsolescent skills, often justly in the case of simple on-the-job training (for example, Cuervo, 1985). Sometimes standards actually fall because older employees withhold some of their knowledge to protect their own jobs. As Thurow (1980) observes, the removal of this training disincentive may be an important benefit accruing from a seniority system for hiring and firing in which each trainer's trainees is fired before he or she is.

Obviously new skills cannot be imparted by on-the-job training, but most enterprises surmount the problem by having recourse to various types of external training: short courses at government, industry or proprietary training centers, training by suppliers of equipment incorporating new technology, secondment to more advanced enterprises in other countries, etc. This is the case in both developing and industrialized countries, although it may be true that this infrastructure is weaker in the former. The problem is not so much with the implementation of a decision to innovate, as with the taking of the decision itself. The greater the weight of ad-hoc methods in the training of supervisory and managerial workers, the narrower their horizons are likely to be. This is illustrated by the Daly, Hitchens and Wagner (1985) case-study of British and West German manufacturing plants in the metal-working trades. The senior staff in the British plants had a much lower level of formal technical training than their German counterparts and they were much less receptive to the timely introduction of new technology.

Economies of scale

On-the-job training

In contrast to other modes of training, on-the-job training may be relatively efficient at low volumes of training and inefficient or even impractical at high ones. It may be possible to schedule a small diversion of experienced-worker time and equipment time for training without significantly affecting output, but there is usually a limit to this type of accommodation and the unit cost in terms of lost output increases once this limit has been reached.

An example of diseconomies of scale and its implications is provided by the on-the-job training for entry-level interconnect telephone technicians described by Lynton (1979). It takes ten weeks and is expensive in terms of lost output. Employers consequently have a limited absorptive capacity for trainees and prefer that their preparatory general should be provided by center-based schemes, which can release small numbers of graduates distributed throughout the year, rather than by vocational education schemes which release them in large batches annually or semi-annually.

Vestibule training

The greater is the volume of training, in terms of the number of trainees relative to the number of experienced workers, the more severe are the diseconomies of scale of on-the-job training, but at the same time the greater are the economies of scale of vestibule training. In this form enterprise-based training enjoys the same economies of scale as nonformal center-based training.

Quality of training inputs

Training costs normally represent an insignificant proportion of the total operating costs of an enterprise and if there are shortcomings in the quality of training inputs, the reasons are usually non-budgetary: trainers may lack pedagogical skills and they may not know how to locate and select training manuals or other training aids. When idle time of productive equipment can be used for practical training, enterprise-based training generally has an enormous advantage over other modes. This not always the case, however. Productive equipment may be so complex that it is not useful for training purposes, the risk of injury to the trainee or damage to the equipment or the product may rule out its use for training, and there may be no utilizable idle time.

Accountability

Accountability of trainer

The fact that the enterprise bears the cost of the training, including the opportunity cost of the trainee's time, provides it with powerful incentives to design the training effectively, keep its duration to a minimum and eliminate unnecessary expenditure. Decisions to authorize the training are

well-informed, the objectives are well-defined, and the decisionmaker has detailed knowledge of the context.

Accountability of the trainee

The trainee has powerful incentives, both carrot and stick, to absorb the training. His chances of being promoted, and the external market for his skills, may be improved by mastering the training. A failure to absorb the training may correspondingly reduce his promotion chances. In the case of a probationary worker, it may lead to termination. The immediate applicability of the training, coupled with the fact that it normally takes place at or near the worksite, helps to assure a high rate of transfer. Newly-trained skills are not allowed to atrophy for lack of immediate exercise.

Problems of enterprise-based training

Limited objectives

An obvious limitation of ad-hoc enterprise-based training is that, by its very definition, it has narrow, short-range objectives. It is true, of course, that substantial skills can be developed by means of a series of short steps--the fact that even in advanced countries many workers become skilled craftsmen without any formal training whatsoever is sufficient evidence on this score. But a structured programme is more likely to include those complementary inputs which individually never have high priority at any particular moment but which collectively give the training extra breadth and depth. If a simple lathe-operator is all that is required, ad-hoc on-the-job training may be both the cheapest and quickest method. But if one is looking for a lathe-operator who will later rise to a supervisory position, or who will be able to handle progressively more advanced technology, ad-hoc training is less likely to be effective.

Inadequate scale of provision

A second common criticism concerning ad-hoc enterprise-based training is the inadequate scale of its provision. This complaint should be treated with caution. The scale of provision is seldom known with any accuracy--even in the industrialized countries estimates tend to vary widely--and it is very difficult to test the hypothesis of underprovision. A failure of an enterprise to provide training may result from an evaluation that the benefits of training are lower than its costs, in particular the opportunity cost of the trainees' and trainer's time, and the decision may be rational in social as well as private terms.

Nevertheless it is evident that the complaint is frequently justified, for a number of reasons. One is inertia on the part of the enterprise. The manager may lack the ability to organize anything more complicated than simple on-the-job training and may be too uninformed or too passive to take advantage of available off-site training. The inertia may be reinforced by a belief that it is the responsibility of the state to provide training. Ironically this view was often in the past promoted by the state

itself in precisely those countries where the public purse can now least bear the burden.

Another reason for underinvestment in training in non-firm-specific skills is a fear that the trained worker will be poached by a competitor or will set up on his own account, the training firm both losing its investment and being obliged to incur hiring costs in recruiting a replacement. Obviously the severity of this problem depends upon the relative importance of internal and external labor markets.

Where the internal labor market is strong, poaching can be ignored. An extreme example is provided by those large enterprises in Japan which practice the lifetime employment system, but nearly everywhere large enterprises create internal labor markets which foster the development of key skills in short external supply. Indeed the very provision of periodic in-service training as part of continuous career development may be as important to the maintenance of the internal labor market as job security and the linking of payscales to seniority.

Even where the labor market for skilled workers is competitive and mobility is high, poaching should theoretically not have an inhibiting effect on enterprise-based training, if the firm is able to shift the cost of the training to the trainee by getting him to accept sufficiently low wages while being trained. In practice, however, the only evidence of successful shifting is confined to extended entry-level training, and in particular, apprenticeship.

5.3 Regulated apprenticeship

It is easy to forget that the regulated apprenticeship is a relatively recent development in industrialized countries. Until the present century an apprenticeship contract would specify a number of years of training but not the acquisition of certified competence and the conditions of the apprentices might be arduous. This fact moved the Webbs to write in 1913 that "over by far the largest part of the limited field in which apprenticeship once prevailed, the system has gone practically out of use. Undemocratic in its scope, unscientific in its educational methods, and fundamentally unsound in its financial aspects, the apprenticeship system, in spite of all the practical arguments in its favor, is not likely to be revived in a modern democracy" (cited by Ryne and Weir, 1978).

Nevertheless the apprenticeship system has not only survived but has been disseminated around the globe and is now firmly entrenched in some of the least developed countries as well as in most of the advanced countries.

One factor behind its survival in some countries has been its use as a means of limiting the numbers entering an occupation, and the prime organizers have been unions rather than employers. But a more important factor has been the introduction of legislation to regulate the system, although this has come late, compared with other forms of social legislation. In the UK, for example, there was no legislation of any kind governing

industrial training until the 1964 Industrial Training Act. Until then day-release was not compulsory and it was estimated that only 30% of apprentices were getting it (Williams, 1963).

At the same time there has been a movement away from time-serving to the acquisition of certified competence, sometimes through the adoption of a modularized framework on the lines promoted by the ILO. This has required the creation of tripartite industry-wide or national institutions responsible for devising and updating the specifications of the module.

In spite of these developments the option of using apprenticeships as a mode of training provision remains overlooked in some quarters. In Africa formal apprenticeship schemes are hardly found at all and in some Latin American countries the term is used to denote what elsewhere would be described as pre-employment center-based training.

Apprenticeship in large and small enterprises

There is a widely-held view that apprenticeship is viable only in large enterprises, small ones not having either the resources or the facilities to sustain it. It is often proffered by small enterprises themselves as justification for their unwillingness to take on apprentices. This view is basically false, but it is true that the ecology of apprenticeship is different in large and small enterprises.

Although it is easy to find exceptions, as a general rule large enterprises account disproportionately for specialized manpower requiring high levels of training. The training is expensive, in terms of the cost of instructor time and other overheads. In the largest firms it may not take place on-the-job at all but in dedicated vestibule facilities where the trainee will not slow down the production line, reduce the productivity of established workers, be exposed to danger, and can hear the instructor. Consequently, during his apprenticeship he may make little or no contribution to output.

The enterprise regards the training as an investment which it will recoup by persuading the trainee to remain on its staff after he has become qualified. In some instances the worker may be bonded for a specified number of years. More commonly it will use the financial or other inducements with which it creates its internal labor market. It may simply be able to offer a higher salary than competitor firms, the marginal product of the worker being higher in it than elsewhere (either because part of the training was firm-specific; or because the firm uses more sophisticated technology). Since the apprentice allowance is a minor part of the investment, it is set at a level which attracts those with the greatest innate competence, with the aim of securing the best possible return on the training.

In small enterprises the picture is very different. Unless the training is predominantly firm-specific, which is unusual in regulated systems, it has no means of ensuring that the apprentice will remain as an employee when qualified. Hence, unless the government provides some kind of subsidy or altruistic motives prevail, it cannot be expected to pay the

apprentice an amount more than the actual value of his output less the cost of his training. This rule is not applied on a month-to-month basis but to the training period, typically three years, as a whole, with the apprentice receiving a gradually increasing allowance which permits him to be overpaid initially and underpaid towards the end of his term. (In the absence of this smoothing arrangement, the initial allowance might well be below subsistence, or even negative if the cost of training exceeded productivity.)

Obviously this contrast between large enterprise and small enterprise training is oversimplified, but it is clearly discernible in the different approaches to apprenticeship in the industry and handwork sectors of the West German dual system (Dougherty, 1987b). And it is illustrated by the finding of Prais and Steedman (1986) that small firms in the construction trades in the U.K. are actually more willing than large ones to take on apprentices. The larger firms tend to be engaged on the construction of new buildings "which require rapid, organized, output; on such a site there is no place for a trainee who, as often as not, may just get in the way of the craftsman. Wage arrangements are also often such that the craftsman is not prepared to lose his output-bonus to give time to teach a trainee." By contrast, in the smaller firms, which tend to be engaged in maintenance and repair work and are under less pressure, "there is greater scope for a lad who is prepared to fetch and carry, assist and learn."

5.4 Strengths and weaknesses of regulated apprenticeship

In principle the classic apprenticeship system has most of the strengths of ad-hoc enterprise-based training while remedying its shortcomings. The fact that it takes the form of an organized programme lasting several years makes it suitable for substantial skill-development, particularly for entry-level occupations. The inclusion of complementary off-site general and theoretical education helps to overcome both the inherent conservatism of practical training and its limited ability to promote cognitive skills. And the fact that apprentices are considered to be separate from the regular labor force offers scope for the provision of incentives to encourage employers to recruit them, and scope for government intervention.

In practice there are several aspects of apprenticeship which dilute its effectiveness, most of them pertaining to the fact that it is primarily intended to be entry-level training and of long duration.

Speed and flexibility of response to training needs

The organized framework which sets regulated apprenticeship apart from more informal arrangements provide the system with an inertia which protects it from subversion but also reduces its ability to respond to changing needs.

In some countries, for example West Germany, the problem is countered by a periodic comprehensive overhaul of the syllabuses and the accompanying trade tests. There are two problems with this approach. One is that it requires the creation of an administration for the purpose, a solution which is often impractically resource-consuming in developing countries. A

second problem is that technological change is increasing the complexity of skill development, cognitive skills displacing manual skills even in manual occupations and breadth becoming more important than depth. As a result the occupational structure is becoming increasingly complex and ill-defined. The old occupational labels may still be in use, but they mean less than they ever did and are of diminishing operational utility for devising a training programme.

There have been two responses to this problem. One has been to introduce modular systems with the initial modules imparting broad skills. In some contexts, particularly for the more traditional craft trades, this appears to be a satisfactory solution. But in others it is arguable that any attempt to impose detailed syllabuses is undesirably restrictive, and that the only realistic solution is to give the enterprise greater latitude in devising its own schemes. Although it carries the risk that the enterprise will take advantage of the opportunity for giving greater priority to its own objectives than to those of the trainee, this approach is seen in some places as an increasingly attractive solution to the problem of training for technical occupations and the only alternative to abandoning the apprenticeship system altogether. Understandably this development has encountered resistance from regulatory bodies, but the "Situational Apprenticeship" arrangement in Sri Lanka provides a noteworthy example.

A third and more radical response is to abandon the apprenticeship model in favor of some looser arrangement. In Hong Kong, for example, "the duration of a three-year or four-year indenture is increasingly perceived by both employers and young job seekers as imposing too long a span of commitment. Moreover, the notion of an occupation--together with the elements of inclusivity it suggests--with which the apprenticeship institution is associated often engenders such rigidities as occupational demarcation, regulatory/restrictive "custom and practices" which favor status quo rather than changes and innovations. In this context, the training strategy of the smaller shops in the old but modernizing industries (like furniture-making and printing) has been to engage learners or quasi-apprentices on terms comparable to semi-skilled workers, who will acquire the practical skill through on-the-job experience and the related theoretical knowledge by way of evening self-study. In other words, it suggests a less formalized and expensive strategy of recruiting and grooming skill outside the ambit of the apprentice institution (Ng, 1986, p. 29).

Economies of scale

The diseconomies of scale problem discussed in Section 5.2 is probably even more serious for apprenticeship than for ad-hoc enterprise-based training. Most apprentices are expected to contribute to production and the value of their output can be a significant factor in the employer's decision to offer an apprenticeship place. However apprentices can only take on certain types of work and there is normally a limit to the amount of such work which may efficiently be assigned to them rather than to those with more experience. Hence, the greater the number of apprentices attached to a given operation, the lower will be the productivity of each, the greater will be the net cost of training.

Selection

As in the case of other forms of extended pre-employment training, selection for apprenticeship is primarily self-selection by young people who often have only partly-formed ideas about their occupational destination. As Benz (1968) observed, writing at the time that West Germany was beginning to re-organize its apprenticeship training on a modular basis, the selection problem can to some extent be side-stepped if the training programme is of modular form, beginning with a broad-based basic training and progressively becoming more specialized. In such a program the aptitude and motivation of the trainee gradually become revealed and he has some scope for modifying his objectives to match his own characteristics. The problem can also be mitigated by redistributing the provision of training from pre-employment training to in-service training, keeping the length of apprenticeship to the minimum required for an entry-level job.

Quality of training inputs

The employer-sited, practical component of apprenticeship differs little from ad-hoc enterprise-based training with regard to the quality of training inputs. There may be a greater effort to secure the services of a specially-trained instructor, but in the setting of most developing countries it is unrealistic to expect enterprises to provide meister-quality instructors in emulation of the German dual system.

The main difference between ad-hoc and apprenticeship training is the off-site related theoretical instruction provided in some countries. The difficulty of coordinating this complementary instruction with the practical training is frequently underrated, problems arising both in regard to the curriculum and to logistics. The experience of INACAP in Chile has shown that the development of a temporally-integrated curriculum can prove prohibitively expensive in terms of coordination and supervision, with the result that efforts in this direction are frequently half-hearted and the off-site instruction becomes an autonomous form of development. In some cases the off-site instruction largely precedes the rest of the apprenticeship, as in those schemes (for example, in Britain and Hong Kong) where the first year may be spent in a non-formal training center.

The logistics of the provision of off-site instruction often present formidable obstacles. In urban areas in industrialized countries one can expect to find institutions capable of providing complementary instruction for the higher-volume schemes at reasonable unit cost. In developing countries, in less densely populated areas, and for the minority occupations, it may be much more difficult to secure acceptable economies of scale. To some extent the problem may be overcome by switching from day-release to block-release and residential courses (which again mean high unit costs) instead of day-attendance, as in Fiji (APSDP, 1981a), but often the outcome is that the related instruction goes by default.

Accountability

The short-term nature of most ad-hoc training makes it possible to evaluate the improvement in the performance of the trainee and this provides a basis for the accountability of both trainee and trainer. In apprenticeships the objective of the training is the development of broad occupational skills, is less immediate and the day-to-day accountability of both trainer and trainee is correspondingly diminished. Even in the dual system in West Germany one will find apprentices in smaller establishments sweeping the floor and being sent out to fetch the beer.

To some extent trades testing can provide a corrective influence and there is evidence that these effects are the greater, the more thorough the post-test. In particular, and not surprisingly, there is evidence that the beneficial effects of certification for manual occupations are the stronger, the more rigorous the tests of practical skills.

For example, Prais and Wagner (1983) contrast the German use of practical tests with the British use of in-course assessment in the construction industry: "the practical tests are intended to examine what an apprentice can do working on his own...efficiency requires in this industry particularly that a man should be able "to get the job right" without constant supervision. A system of "in-course assessment" all too often permits a trainee, with the help of guidance of hints, to get it right eventually" (emphasis in the original). The British construction industry replaced practical tests with in-course assessment in 1976, but Prais and Wagner report that a subsequent deterioration in standards of craftsmanship is causing it to return to practical testing. Prais and Steedman (1986) express similar views in a comparison of British and French certification of training for the building industry.

Placement

The decision to enter an apprenticeship is taken at an early age and the apprentice may change his mind about his intended occupation. Data on placement rates in training-related occupations are very hard to come by, tracer studies being undertaken infrequently for apprenticeship, but casual evidence suggests that they tend to be much higher than for school-based training.

As with other modes of training, it is not always clear to what extent a failure to enter a training-related occupation constitutes a waste of training resources. Indeed the greatest single advantage of apprenticeship over other training modes is often held to be, not its contribution to skill-development, but its ability to ease the transition from school to work through its affective impact on the trainee, most especially its inculcation of a respect for industrial values. This is certainly a major reason for the enthusiasm for the dual system in West Germany, at least among employers, to the point where government intervention has been resisted for fear of diminishing the effect (Hayes, Anderson and Fonda, 1984). Other examples may be found elsewhere: for instance, the forthright declaration of the Deputy

Director of the National Apprenticeship Board of Sri Lanka that "the main strength of apprenticeship is its affective function" (Nanayakkara, 1981).

5.5 Apprenticeship in the traditional sector

As was observed in Section 2, the indigenous apprenticeship systems found in many developing countries, some with an ancient history, were long neglected in the development literature. Even now there is a tendency to regard them as part of a tradition somehow distinct from the Western model.

However, there is now ample evidence that such a view is mistaken. The different forms of apprenticeship lie on a continuum which stretches from father-son relationships at one extreme to the regulated apprenticeship at the other, but they fulfil the same function and are differentiated mostly by the extent of the resources devoted to them. While a West African printing apprenticeship has little in common with apprenticeships in large enterprises in industrialized countries, it is not so different from those in craft enterprises in the same countries and certainly comparable to the arrangements from which the latter have evolved.

It is true that there is typically no regulatory body (though note the Yoruba guilds described by Lloyd, 1953), that there is no related off-site instruction, and the skills transferred are relatively narrow, but then it must be remembered that the same was equally true in most apprenticeship schemes in the industrialized countries until comparatively recently, and the practical impact of the reforms is often exaggerated. The most important differences are that the level of education of both master and apprentice are usually much lower, the techniques of production much less sophisticated, and hence both the investment represented by the training, and the rewards accruing to it, that much more limited.

The quality of the training provided by indigenous apprenticeships for technical occupations is justly criticized as being inferior to the more theoretical training provided by formal arrangements: "employers and workers in the informal sector display remarkable persistence and ingenuity, often under difficult conditions, but we must not allow our admiration for this to lead to the conclusion that everything they do is the optimum response to the circumstances in which they are. The quality of many informal sector products is very low, even when the simple requirement of the enterprises and the modest needs of their clients are taken into account; their methods are often inefficient and their standard of "management", broadly defined, is very low" (Harper, 1987).

Nevertheless there is no question that indigenous training can and does impart functional competence: "it can be said with some assurance that the indigenous apprenticeship does an effective and, indeed, admirable job of accomplishing what it claims to do, which is to training young artisans for successful commercial practice in their profession. Apprentices leave their master's workshop in possession of a viable repertoire of practical skills for dealing with the actual repair problems they will face on the job. For the vast majority of apprentices, these skills are soon put to productive use in

the society at large, either in the form of skilled employment or self-employment" (McLaughlin, 1979, pp. 239-40). And while it is true that the range of competence may be limited, this problem can be overcome by the clustering of related skills: for example, the welder and the blacksmith operating in close proximity to the automotive mechanic (Koll and Lajunji, 1967).

Strengths and weaknesses of indigenous apprenticeship

Adaptation of the training to local conditions: Indigenously-trained apprentices possess some advantages over the formally-trained which may go some way to compensate for their inferior knowledge of theory. One is their ability, derived from extensive hands-on experience in actual working conditions, and the cultivation of working relationships with counterpart informal-sector artisans like welders and blacksmiths, to improvise when appropriate parts or tools are not available. This resourcefulness can be of crucial importance in those countries where imports are expensive or their supply erratic. For instance, McLaughlin's detailed study of automotive mechanic training in Ghana concludes, "their sometimes ingenious improvised repairs in seemingly hopeless situations epitomize their unique contributions to the transportation industry...while some see the wayside mechanic as a poorly-trained illiterate who mixes crude tools with shoddy practices, others see him as a truly creative craftsman with an extraordinary capacity to survive--even thrive--under conditions that would thoroughly frustrate a more systematic mechanic." (McLaughlin, 1979, pp. 201-2).

Development of business skills: A second advantage is that their apprenticeship may help to prepare for their role as small businessmen: "Although formal vocational schools and technical institutes also teach the technical skills of motor mechanics, only the wayside workshop provides the opportunities to learn the more important entrepreneurial and managerial skills they will need in operating their own workshops. An apprentice who has stayed with his master for four or five years will have acquired considerable experience in supervising younger workers, taking overall responsibility for the quality of repair jobs, dealing with customers, and cultivating relationships with spare parts dealers. Often, these entrepreneurial skills are overlooked by critics of indigenous training and frequently even by the apprentices and master themselves. With all the attention given to the technical skills of the trade, it is sometimes left unrecognized that a whole dimension of valuable managerial skills are being learned quite unconsciously by apprentices" (McLaughlin, 1979, p. 202).

The same point is made by Allen in the context of tailoring, drawing on his study of apprentices in Zaria, Nigeria (Allen, 1982): the apprentice must learn "not only how to sew, but how to find and treat customers, and generally how to make out in an increasingly competitive market in which he will be surrounded by hundreds of other equally skilful tailors."

Not infrequently the transition from apprenticeship to self-employment is eased by an intervening period of wage-employment in which the employee may work on his own account in his spare time (Tunisia, National Institute of Statistics, 1977, p. 150).

Affective impact: The affective impact of apprenticeship is generally regarded as being as important in the indigenous systems as it is in the regulated ones in the modern sector. The apprentice typically starts his training at a much earlier age than in the European systems and may effectively become part of the household of the master, who thus becomes responsible for bringing him up as well as imparting occupations skills. As Allen observes, "this phase of his life--what would conventionally be termed "adolescence" in the West--is crucial in many other ways than the purely vocational. His view of what is happening around him, his perceptions and aspirations, his attitudes and values, are framed to a large degree within this context of his relationship to his master and his work" (Allen, 1982). While one may have mixed feelings about the wider implications of this inculcation of values, there is no doubt that it serves to facilitate the transition into employment, and especially employment related to the training, in a way that institution-based training does not.

Technological conservatism: One of the weaknesses of the indigenous apprenticeship system is the inherent conservatism in the transmission of skills. The master cannot pass on more than he knows himself and the apprentice has little everyday recourse to other sources of skill development. It should not however be inferred that the small-scale enterprises that host the indigenous apprenticeship system are forever trapped at a fixed level of technological expertise. Machines replace hand-tools, and power machines manual ones. The process can be dramatic, as is illustrated by the recount of a Tunisian carpenter that "one worked manually until a Maltese installed machines in the town center and rented them out at 6 francs an hour. Before that one would spend much more time on a job but it was better done. I was earning 10 francs a week before, and 10 to 25 francs a day afterwards. One used to be able to spend a whole year working on an order for a single house, and now a door is ordered in the morning and collected the same evening" (Tunisia, National Institute of Statistics, 1977, p. 150).

Allen (1982) warns explicitly against attempts to characterize specific traditional sector trades in terms of "traditionality" or "modernity": "Tailoring, for example, though in existence for many centuries and a crucial component of the indigenous culture, has taken on a radically different form in recent decades. The present-day tailor [in Zaire] is likely to sew and embroider on a Spanish machine; use cloth produced by large multinational concerns based in Kaduna; and sell his goods on a market, the characteristics of which are determined by a highly inflationary, oil-based and internationalized economy. The skills, products, technology, market, and relations of production of the tailor are "modern". Indeed, there are few skills about which much the same could not be said."

5.6 The scope for government intervention in the modern sector

A large number of different types of stick and carrot incentives for the promotion of enterprise-based training are in use around the world. The most common types are financial (subsidization of trainee wages, subsidization of training-related education, and levy/grant schemes), or regulatory (maximum or minimum ratios of apprentices to skilled workers), but these do not exhaust

the possibilities. Indirect methods intended to improve the climate for training, for example by reducing labor mobility, may also be effective.

Financial incentives

As a practical matter the provision of financial incentives designed to promote enterprise-based training, and the mobilization of resources to fund the incentives, are usually treated as a package, the most obvious example being a levy/grant scheme. From an analytical viewpoint, however, the raising and spending of revenue in general have no close connection. The raising of revenue, whether it be via a tax on the pay-roll, on profits, on sales or on value-added, constitutes an erosion of the company sector tax base, and it almost immaterial whether the proceeds are used for training or for general expenditure: a payroll tax, for example, may in principle have an effect on employment caused by the alteration of relative factor prices, but the impact is likely to be minimal, given the very low absolute rates actually applied. The imposition of a tax may however be politically more acceptable if it is earmarked for a specific purpose like training, and this no doubt accounts for the popularity of sector-specific training taxes.

The administration of a system of financial incentives does require the establishment of a specialized national agency whose existence may not be an unqualified blessing, especially if it has access to a protected source of revenue. As Grabe (1981) observes, "an effect often overlooked is the bureaucratization of the training system which has taken place in most countries in which a levy system has been introduced. Some of the national training bodies created with its help have grown into comprehensive organizations, some of them with more administrators than teachers and instructors. While training in the past generally was underadministered and still is in many countries a levy-guarantee scheme seems to invite moving to the opposite extreme. This bureaucratization applies not only to the central body and its regional wings but often also to the industrial and other undertakings concerned. The central board demands to have a specialized contact in the enterprise--a training officer, who preferably devotes all his time to the cause (and whose salary might constitute deductible expenditure under the levy)."

Subsidization of trainee wages

In some countries the national training authority assumes responsibility for part or all of the wages received by apprentices. This may encourage the provision of training places by reducing the net cost of the apprentice to the employer, holding wages constant; or it may have the effect of making apprenticeship more attractive to potential recruits, if the contribution of the employer is unchanged. In practice the impact of the subsidy is likely to be shared between these two extremes. Examples are the 100% payment of apprentice allowances by the National Apprenticeship Board in Sri Lanka, the 50% subsidization of apprentice stipends in enterprises employing fewer than 500 workers in India, and the supplementary pay given to those completing military service in Singapore intended to bridge the gap between their national service pay and apprentice wages (APSDEP, 1981a). A reverse example is the elimination of the disincentive represented by

unemployment benefits for unemployed school-leavers who have declined to enter either apprenticeship or the Youth Training Scheme, currently proposed in the United Kingdom.

Subsidization of direct training costs

The cost of training-related education, the instruction received off-site via day release or block release, is seldom borne directly by the enterprises benefitting from it. The actual source depends in practice largely on the type of institution providing it. In some countries, for example the Federal Republic of Germany and the United Kingdom, the training is provided in establishments belonging to the Ministry of Education and it is automatically financed from general government revenues like any other form of education. In others, as in many Latin American countries, it is provided by non-formal training institutions funded by a pay-roll tax, and hence is indirectly financed by the enterprises collectively.

Subsidization of direct training costs

When the direct costs of training are subsidized, the usual vehicle is some form of levy/grant scheme. Although in principle such schemes may be highly attractive, in practice they often fail to have the expected impact.

In the first place, the administrative cost to the firm of applying for the grant may be prohibitive. This is particularly the case for small firms and is widely held to be a major factor responsible for their failure to take advantage of levy/grant schemes, despite paying the levy. (Another factor is that they often see no need to set up formal training programmes.)

Second, it is not hard to point to examples where bureaucratic inertia, misjudgment, or inappropriate incentives have negative effects. For example, when a government introduces a levy/grant scheme under which only training schemes of at least 6 months' duration qualify for grants, it is amazing how many three month schemes are doubled in length. And when a public authority awards cost-plus contracts in which training is counted as part of the cost, training, or at any rate spending on training, receives greater attention than ever before (Mangum and Mangum, 1984, p. 10).

Third, as Grabe (1981) points out, levy/grant schemes "tend to emphasize accountable costs and draw attention away from the less formal methods of training; thus, for instance, from training given in the work situation. In other words, they reinforce the trend towards further institutionalization of training and tend to counteract efforts to restore training on the job."

Regulatory interventions

The chief regulatory interventions are the imposition of minimum or maximum apprentice:experienced worker ratios within the enterprise for given occupations. The maximum ratio is often union-inspired and intended to maintain the quality of the practical training by not overburdening the workers likely to be responsible for it.

Minimum ratios, on the other hand, are designed to stimulate the volume of training and may vary from occupation to occupation in the same country. In India, for example, the Apprenticeship Act of 1961, as amended in 1975, prescribes a minimum ratio of 1:2 for tool and die makers and 1:7 for carpenters and bricklayers.

In some countries the national authority regulates the wages paid to apprentices without contributing to them. The usual format is a prescribed ratio of apprentice wages to experienced worker wages. The usual intention is to prevent the exploitation of the apprentice, but the measure can have an inhibiting effect on the provision of apprentice places if apprentice wages, especially initial apprentice wages, are set too close to experienced worker wages. In Panama, for example, "the lack of formal apprenticeship training is not out of choice. The Labor Code's equal pay for equal work provision and universal minimum wage have prevented the development of such systems...the universal minimum wage of the code does not allow employers to pay apprentices on a different scale as they learn. This...makes it almost impossible to carry out apprenticeship training programs. Most employers believe that personnel in training have lower performance and productivity levels than do regular workers and that trainees should be compensated by lower rates of pay." (Cuervo, 1985).

Measures aimed at reducing mobility

Private sector enterprises often cite the high mobility of the labor force as a major deterrent to the provision of training, and this would certainly seem to be the case in Korea. It follows that training provision might be promoted by measures which have the effect of reducing turnover, obvious examples being job-security and minimum-wage legislation. Usually such measures are introduced with other objectives in mind, but in Indonesia the expectation of encouraging training by reducing job-hopping was a factor behind the establishment of minimum wage legislation (Ichimura, 1983, p. 89). However, a heavy-handed implementation of such measures carries the risk of widening the gulf between the regulated sector where they are enforced (usually larger enterprises in urban areas, especially those which are foreign-owned) and the unregulated sector which flouts them, encouraging the adoption of even more capital-intensive technology in the regulated sector and diminishing its capacity for disseminating skill development via the outflow of its workers.

5.7 The scope for government intervention in the traditional sector

Awareness of the existence of informal apprenticeship schemes and other sources of skill-development in the traditional sector has stimulated an interest in exploring the scope for promoting them as a recognized component of the national training system. For example, a recent study of apprenticeship in Asia and the Pacific (APSDEP, 1981), noting that the regulated apprenticeship system was a superimposed colonial model, stated that one of its purposes was to "identify, in a number of key occupational areas which include both small and larger undertakings and in which both formal and

informal apprenticeship practices are known to exist, the possibilities for reinforcing and improving--and possibly amalgamating--the two parallel systems".

Unfortunately the objective had to be abandoned for lack of information, and even now relatively little is known about the effectiveness of government intervention designed to promote or exploit training in the traditional sector, whether in harness with modern sector training or otherwise. Over the past few years the case-study literature has expanded rapidly but it seldom offers an evaluation of a well-established programme. All too often the reports describe small-scale pilot projects heavily dependent on the services of a few dedicated individuals with minimal cost-recovery, and hence their replicability or even long-term survival may be doubtful. Evaluations of impact are often confined to summaries of numbers completing the training and even basic cost data are sometimes lacking. In Sub-Saharan Africa, for example, Liedholm and Mead (1986) conclude that "although there have been a few evaluations of individual centralized assistance centers...there has not yet been a systematic analysis of their experiences or the effectiveness of technical assistance schemes."

Even if authoritative studies were available, the heterogeneity of the traditional sector within any single country, and the differences in its make-up between countries, make it highly dangerous to attempt to come to general conclusions about the efficacy of any type of intervention. A few illustrative studies are summarized below, chosen either because they appear to be success stories (even though there is no suggestion that they should be regarded as prescriptive) or because they incorporated some innovative feature that may be worthy of adoption elsewhere. Further case studies covering a wide range of countries are summarized or synthesized in Phillips (1978), Chuta and Liedholm (1979), Page and Steel (1984), Liedholm and Mead (1986), Nelson (1986a), Bas (1987), Fluitman (1987), and Harper (1987).

Occupational skill-training

Service centers and extension services

The Nigerian Vocational Improvement Centers: In 1962, long before the traditional apprenticeship system had received significant official recognition, and flying in the face of the prevailing orthodoxy, Adam Skapski, a Ford Foundation expert, recommended to the government of the then Western Region of Nigeria that it should reconsider its policy of expanding the public provision of full-time institutional skill-training. He proposed that the Trade Training Centers should be used instead for part-time (day-release or evening classes) instruction to complement traditional apprenticeship and upgrade the skills of the existing work-force. He emphasized the importance of business skills as well as occupational skills and recommended the simultaneous development of a credit operation (Gilpin and Grabe, 1972).

His effort bore fruit and a two-year pilot project was established in 1964, the Business Apprenticeship Training Centre in Kaduna. This provided 10 month courses meeting three times a week for three hours in automobile

service and repair, building, carpentry and furniture-making, with as much time devoted to English, arithmetic, book-keeping and business skills as to occupational training, the only condition for admission being two years prior experience in the trade. Sixty-four trainees were admitted in the first year and double that number subsequently, with most trainees completing and most completers receiving a trade certificate. The Ford Foundation financed the project for the first two years, by which time it was obvious that it was thriving. The Ministry of Trade and Industry took it over, extended and replicated it in other Nigerian cities. The Ford Foundation Request of 1969 observed that "it is quickly evident that this project met a need for which there was a wide demand, both among artisans and in the Ministry of Education" and that the project was regarded as "one of the most successful developments assisted by the Foundation in West Africa" (Gilpin and Grabe, 1972).

Gilpin and Grabe note that among the strengths of the extension service thus established was "the flexible use of facilities and staff of the Vocational Improvement Centers. These are...not centers of their own: they make extensive use of existing schools, workshops, and training centers during periods of the day when these would otherwise be idle. This has made it possible to hold costs to a minimum. The use of part-time staff has also made it possible to adjust offerings to meet the demand for training. Courses can be expanded, contracted, or abolished as demand for them fluctuates." The cost was estimated at just over \$100 per trainee enrolled, one ninth the cost of full-time trade center training.

Among the weaknesses of the programme were the failure of the credit operation and the fact that the trainees were in practice not apprentices but journeymen, and the majority came not from small enterprises but from large ones and government departments. Whether these biases were, or could have been, rectified does not appear to be known. It is reported that the programme is still in operation, but starved of funds, with the result that its extension aspect has been discontinued and the centers themselves have become public workshops rather than training facilities.

The Kumasi Programme for Indigenous Apprentices: McLaughlin (1979) describes a programme established by the Kumasi Vocational Training Center in Kumasi, Ghana for upgrading the skills of way-side mechanics. Apprentices are admitted after one year of experience and they attend for two days full-time each week in three phases: an initial phase of three months, followed by nine months full-time on the job, a second phase of three months, again followed by nine-months full-time on the job. The structure of the rest of the programme is not described but it stretches over three or four years. The instruction is intended to lead to an appropriate national trade certificate and to be sufficiently broad-based to enable the trainee eventually to supervise future training in his enterprise.

The strength of the programme resides in the quality of its Center with its permanent staff and sophisticated training equipment (cutaway engines, etc.). But this dependence on what may be an expensive institution (no cost figures of any kind are provided) also constitutes a potential weakness.

A mobile extension service in Accra and Kuso: McLaughlin also describes a mobile service for improving the skills of informally-trained automobile mechanics organized by an expatriate volunteer in Ghana. While some instruction was center-based, most was provided by visits to workshops of a small team with a suitably-equipped truck. By the time of McLaughlin's report, the original operation in Accra had been taken over by a Ghanaian counterpart and was being replicated in Kuso. McLaughlin terms the project as enjoying considerable success, but its scale was evidently very small and no cost or outcome data are provided.

Subsidized on-the-job training

The Somali Partnership for Productivity Project: The Partnership for Productivity project was established by the U.S. Agency for International Development and the Government of Somalia in 1985 to place Ethiopian refugees with Somali businesses in the vicinity of Hargeisa full-time for periods of one to six months to learn trades for self-employment or management skills (Harper, 1987). The host businesses were paid a fee of \$20 per month per trainee and in addition were given \$1.50 per day to pass on as an apprentice allowance. Eight months into the programme, 272 individuals had been trained in 16 different skills. Given the short life of the project, little is known about the long-term effectiveness of the training, but it is clear that the project, which is due to end in 1987, is costly ("\$2,000 per enterprise started") and very heavily dependent on external funding. The subsidy to the trainers accounts for less than 20% of the total cost, the great bulk of the budget being spent on overheads. The project represents a short-term response to an acute social problem in very difficult conditions. It would be interesting to see how the approach might work as a sustained programme in a more hospitable climate.

Business skills

In view of the heterogeneity and dispersion of the traditional sector it is not surprising that some of the more successful interventions have focussed on the improvement of general business skills, rather than technical skills. Liedholm and Chuta (1976), in their study of small enterprises in Sierra Leone, found that rural enterprises maintaining even a rudimentary set of books, only 17% of the total, were more successful than those which did not, and Chuta and Liedholm (1979) draw attention to studies finding similarly low levels of book-keeping elsewhere (6% of rural enterprises in rural Bangladesh; 11% of rural enterprises in Jamaica).

Not the least attractive feature of small enterprises is their conservation of scarce managerial abilities: their simple organization allows them to do without the more specialized managerial and supervisory skills required in large enterprises and parastatals (Page and Steel, 1984). It follows that effective interventions to improve their business skills may be quite modest in scope.

Book-keeping in Colombia: The DESAP programme of the Carvajal Foundation, established in Cali in 1974, offers basic courses in record-keeping, costing and investment to small businessmen (Harper, 1987). Each course consists of

five two-to-three hour evening sessions and may be taken individually (but sequentially) or as part of a programme lasting for about three months. The average cost per client, including on-site counselling, is about \$250 over two years, and most is recovered through fees and a proportion of the interest on loans. About 150 businessmen enrol per month and one-third complete all three basic courses. Those who do may then become eligible for credit from a separate operation.

The operation appears to be well-established on a permanent basis, is becoming increasingly self-sufficient, and clearly acts as an effective, screening process for the credit operation, which has a current repayment record of over 95%. Although the Carvajal Foundation advises against literal attempts at replication, these measures of success have stimulated interest in similar initiatives elsewhere.

Entrepreneurship Development Programmes in India: The Indian Entrepreneurship Development Programmes originated with schemes established in 1970 by the Gujarat Industrial Investment Corporation Ltd. for financing new entrepreneurs (Patel, 1986). The programmes were soon developed into comprehensive packages involving various types of entrepreneurship training as well as financing, in two main modes: evening classes each day for three months for those with industrial experience, and full-time courses for the inexperienced. Data supplied by Entrepreneurship Development Institute of India indicate that by 1984 8,000 new entrepreneurs had been trained in Gujarat, 3,000 enterprises were in operation, and a further 1,400 about to begin operation. Seventy-five percent of the existing enterprises were said to be in good health. The cost per trainee was about U.S.\$250 and the cost per enterprise therefore approximately double. No independent evaluation appears to be available, but the programme has substantially increased in scale over the past seven years and has been replicated in various forms in twenty other states. Experience with such programmes elsewhere seems less positive, but Patel suggests that this may be attributed to their recent establishment.

Skill development by osmosis from the modern sector

In most countries with significant private sectors, large enterprises have a habit of spinning off small ones, employees leaving to set up on their own account once they have acquired with sufficient occupational experience. In many cases these new undertakings may remain bound to the modern sector but in others their creation constitutes a process of renewal in the traditional sector which fosters the dissemination of both new technology and improved skills. As Herschbach (1987) observes, "to a large extent, it is from organized programmes that skills are learned which, in turn, eventually find their way into the skill repertoire of informal workers. And it is through this inflow of skills, often from formal sector workers who opt to move into the informal sector, that technical upgrading is achieved."

An example of this type of intersectoral flow is provided by the case-study of small enterprises in the metal-working, plumbing and electrical repair trades described by Fluitman (1987). Although the entrepreneurs had mostly acquired their skills through on-the-job training in the family business or as an apprentice, "quite a few" had had experience of employment

in the modern sector, sometimes in the Middle East, and had returned to set up in the traditional sector out of choice.

Is skill-development a constraint on traditional sector output?

Skill-development is only one of several possible constraints on the levels of activity and productivity in the traditional sector. Others are the general level of effective demand, the supply of complementary inputs (capital and materials), or inappropriate government policy. Any training intervention which does not pay due regard to these other aspects runs the risk of automatic failure. It may even be the case that training interventions may prove to be unnecessary once some other bottleneck has been broken.

Effective demand: The traditional sector is almost wholly dependent on the rest of the economy in the sense that the demand for its output depends on the level of activity elsewhere. Although the pattern varies from trade to trade and from place to place, the dependency is primarily a direct one through incomes (King and Byerlee, 1978; Liedholm and Mead, 1986), with much of the output of the traditional sector taking the form of final goods and services purchased by households. Where there are forward linkages to other sectors, as in the case of small enterprises making agricultural implements (Chuta and Liedholm, 1985: blacksmithing in Sierra Leone; Mishra, 1985: machinist manufacturing in India) or automobile mechanics repairing and servicing transport vehicles, they are usually simple and activity-related. The dependency is relatively strong for commerce and services (Papola, 1981), perhaps less so for manufactures, the demand for which may benefit from a scope for innovative import substitution. Isolated instances of exports can be cited but they are of insignificant magnitude (Liedholm and Mead, 1986).

It follows that the rate of growth of the output of the sector is largely limited to the rate of growth of the more autonomous sectors of the economy and that any attempt to expand capacity at a faster rate, either by increasing the numbers employed or by increasing their productivity, will only be self-defeating. The consequence of increasing the numbers employed beyond the saturation point--diminishing real incomes all round for those involved--was termed "involutionary growth" in the ILO Kenya report (ILO, 1972) and has received much more attention than the consequences of saturation caused by productivity increases.

The possibility of saturation of the latter type raises equally difficult issues for policymakers since it gives rise to a trade-off between productivity and employment. As has been noted, part of the new government interest in the traditional sector is attributable to a desire to shift back from the public to the private sector some of the burden of occupational skill development. But part is attributable to the demonstrated ability of the traditional sector to provide employment. And if the second aspect is the more important, as would seem generally to be the case in labor-surplus countries, one may question the desirability of promoting higher productivity through the dissemination of more sophisticated technology or improved training facilities.

This is not the place to embark on a detailed analysis of the issue, but in a saturation context governments may wish to give higher priority to interventions promoting productivity in small enterprises which contribute directly, or more usually, indirectly, to exports or import substitutes than to those which produce final goods or services, especially those for which there is an inelastic demand. There may, for example, be a stronger case for interventions designed to promote the blacksmithing services used in agriculture and automobile mechanic skills used in transport than for those which promote higher productivity among tailors or carpenters.

Capital and credit: Studies of the traditional sector typically report very low capital/labor ratios (for a summary of a number of studies, see Sethuraman, 1981, p. 144). Indeed, this is almost one of the hallmarks of the sector. The studies also show that what little capital is used is internally generated, coming from family sources, savings during a period of wage-employment following apprenticeship, and retained profits after setting up on own account. What they do not show is the relationship between the supply of capital and the demand for it. It is often hypothesized that lack of access to outside sources is a major constraint on the development of small enterprises (for example, Sethuraman, 1981, p. 202). But one may equally well hypothesize that the internal generation of funds, supplemented by the renting of machines from petty capitalists, is by and large adequate in the long run, and that the real constraint lies elsewhere.

This alternative view is supported by the fact that most capital is internally generated physically as well as financially. For example, Oshima (1971) reports that "many of the structures (by far the largest component of reproducible fixed capital) used by smaller firms for productive purposes are homes built for living purposes, or extensions which are, to a large extent, own-account produced. Similarly, tools and equipment used are also, to a certain extent, home-produced. Unlike capital in the capital-intensive sector, and like agricultural capital, much of the capital is produced as part and parcel of or mere extensions of the activities of the small firms..."

If this second view is correct, the establishment of a credit scheme may actually undermine one of the most attractive features of small enterprises. As Page and Steel (1984) observe, "the lack of access to institutionalized finance is one explanation for relatively high labor intensity and productivity in small-scale enterprises. In this circumstance, provision of institutional finance to small-scale enterprises may risk encouraging more capital-intensive techniques, thereby reducing the expected benefit".

What is known without any doubt is that government intervention to provide external finance has been largely unsuccessful. Such schemes have generally achieved insignificant coverage, have been expensive in terms of the administrative cost of processing each application, and have often been plagued by default on repayments.

Shortages of materials: In some developing countries small-scale enterprises, particularly those in manufacturing, can be heavily dependent on imported raw materials and supply shortages can be a chief constraint. In Zambia, for

example, there is a strong excess demand for the services of agricultural blacksmiths. However, all steel supplies are imported and the monopoly importer, Zambia Steel and Construction Supplies, a parastatal company, does not have a specialist knowledge of the requirements of the agricultural tools trade or a sufficiently extensive network to reach the rural artisan (Tembo, 1987). Since the occupation is precarious, there is a shortage of rural artisans, with the result that ox carts are manufactured whole in Lusaka and transported to the provinces instead of being assembled in the latter using local timber with the centrally-sourced fittings.

Inappropriate government policy: Government policy can inadvertently have an adverse affect on the traditional sector, either by discriminating against its access to factors of production or materials, or by depressing the market for its products. An example of the former is provided by the Sierra Leone Development Ordinance of 1960 and the New Development of Industries Act of 1981 which were designed to encourage industrial investment by exempting firms from income tax and import duties, the criterion of eligibility being a minimum scale of investment which limited participation to large enterprises. Since imported intermediate inputs represent 10 to 50% of the value of the output of small industries (except blacksmithing), this fiscal policy was responsible for serious discrimination (Chuta and Liedholm, 1985).

Even where there is no overt discrimination in favor of large enterprises, the very existence of government controls can discriminate against small enterprises. For example, "even where foreign exchange allocations are potentially available to small firms, [small enterprises] remain at a disadvantage relative to larger enterprises due to their limited administrative resources and their consequent inability to undertake the protracted bureaucratic procedures required to obtain an import license" (Page and Steel, 1984).

An example of government policy adversely affecting the market for the output of small enterprises is provided by the Zambian case. After independence the government embarked on a mechanization policy for agriculture. As Jonsson (1987) relates, "in order to speed up development and to buy time, the new leaders of independence of Zambia wanted to benefit from the latest technology and to use sophisticated methods of farming. Anything else other than tractors was considered by many as colonial wishes to maintain the people poor. Draught animal was understood as being an inferior technology abandoned by the developed world. Why should it be introduced in Africa? A lot of tractors, implements and tools were bought and distributed to the small-scale farmers through various service set-ups. With very few exceptions they all failed badly and became very costly experiences. At independence all farm machineries were imported. Now there are some factories manufacturing hoes, ox-ploughs, ox-carts, etc., but the majority of farm machinery and tools is still imported. Importation, manufacturing, marketing, maintenance and repairs are mainly urban oriented activities except for the commercial farming sector. This bias has never promoted the development of the important local craftsmen's skill which is a precondition for any successful mechanization programme."

The chronic acute shortage of foreign exchange has finally led the government to encourage the use of draught animals instead of tractors, but even now "policy-makers and their advisers make no real attempt to get out of Lusaka and inform themselves of conditions in the areas for which they make decisions" (ILO/Zambia Ministry of Agriculture and Water Development, 1987).

Complementarity of interventions: As many writers have pointed out, in many situations several factors simultaneously constrain the growth of small enterprises and one should think less in terms of identifying the binding constraint and more in terms of evaluating what elements are needed in a packaged intervention, and with what weights. As Phillips (1978), for example, observes, the success of an intervention in the informal sector depends on the extent to which members of the target clientele can be motivated to attend courses: "their motivation is greatly influenced by the economic gain likely to result, or in the case of social programs, from the perceivable addition to well-being. Training directly related to productivity criteria has to be tailored to labor market prospects, which in turn depend greatly but not exclusively on the availability of the other factors in production. In the economic and social context of the low income countries, where most of the urban poor live, it would be illusory to suppose that a massive educational effort could raise their productivity and heavily reduce their poverty, except when other factors in productivity (capital, entrepreneurship, know-how) were also in evidence on the required scale."

There is, however, a risk that this view may make the problem seem more complex or intractable in some cases than it really is, for there is always the possibility that some of the apparent constraints may be endogenously self-loosening. As in the case of simpler initiatives, the effectiveness of a packaged intervention is likely to depend crucially on a detailed knowledge of the context.

Conclusions

Ten years ago the absence of systematic, large-scale programmes to enhance traditional sector training might have been ascribed to a lack of official awareness of the potential benefits, but by now one must start looking for other reasons.

Among the more obvious ones is the difficulty of developing an effective interface with what is a highly diversified and dispersed sector. Bas (1987b) reports that "urban informal sector support policies, when they exist, are generally applied chaotically, insufficiently coordinated and without any link with the Development Plan. In this respect the example of Brazil is typical ... in 1982 responsibility for implementing the various policies and activities in favor of the urban informal sector was vested in eight ministries (including the Ministry of "Debureaucratization") represented by seventeen organizations, not counting municipalities and States".

Administrative problems aside, there is always the difficulty of providing a service of any kind to the traditional sector at an acceptable recurrent unit cost. Unit costs are seldom an issue as such because they are hardly ever estimated and programme budgets tend to be determined

pragmatically, but excessive ones make themselves felt eventually by restricting the coverage of the programme.

A second and related problem is that institutional staff are often irremediably "conditioned by the hierarchical, mono-disciplinary and compartmentalized approach typical of government departments" (Bas, 1987) and, above all, lack the expertise to make a practical contribution to skill development. As Hill (1982), drawing on the experience of a Brazilian programme, observes, "micro-entrepreneurs typically choose a line of endeavor based on past individual or family experience. As a result, many times they have more expertise in questions of technology and production system choice than the program staff serving them. When enabled to invest in new equipment, few are lacking in knowledge about what particular pieces of equipment are most appropriate to their needs."

In view of this, there is a lot to be said for interventions aimed at improving skill development indirectly. One type of intervention, advocated for example by Marsden (1984), is to make small enterprises more aware of, and to encourage them to make greater use of, existing sources of skill-development within the private sector, especially those with which the firm has commercial links: suppliers of capital goods, suppliers of raw materials, and customers.

These sources of expertise will be discussed in Section 8. As Marsden points out, they are more easily exploited by larger enterprises than by very small ones and hence there may be a useful role for a public service, but this should be as a catalyst rather than a direct provider of training. Hill (1982) recommends that this service should utilize local community leaders who are themselves successful entrepreneurs, who can draw on "street savvy" and practical business experience, unlike the university-trained professional who "not only tends toward a level of sophistication that is inappropriate to the micro-entrepreneur's scale of operations, but is also oftentimes of a class background that does not enhance operational effectiveness in the micro-entrepreneur's social milieu". He warns that the establishment of a solid community network is a slow process and interim compromises may be necessary. For example, drawing on positive experience in Brazil, he recommends that consideration be given to the use of university students with appropriate backgrounds. Other writers have advocated the establishment of joint projects with non-government organizations: operating at the grass-roots, NGOs often have good lines of communication with the traditional sector and are attuned to the need for comprehensive, multi-element programmes.

A second obvious intervention is to eliminate illiteracy. Some early studies (summarized in Chuta and Liedholm, 1979, and Hallak and Caillods, 1981) questioned the value of literacy in the traditional sector. But now it is increasingly accepted that "formal and non-formal education directly impacts on the occupational success and mobility of individuals within the informal economic sector. For one thing, evidence suggests that those with basic literacy and numeracy skills fare better in the informal sector than those who lack these basic skills. Moreover, the lack of functional skills often prevents the individual from taking advantage of the

training opportunities that are available locally, and may constitute the single most tenacious barrier to occupational progress" (Herschbach, 1987).

The importance of functional literacy as a foundation for training for some occupations is reflected in it sometimes being made a prerequisite for access, even when the training is provided for the traditional sector, as in the case of the Programa de Habilitacion Ocupacional of INCE in Venezuela (Bas, 1987). In Pakistan, while employers imposed no educational requirements for entry to indigenous apprenticeship training for welding or metal fabrication, they insisted on at least eight years of schooling for apprenticeship for refrigeration repairmen and lathe operators (Fluitman, 1987).

Adult programmes may contribute to the eradication of illiteracy, but there is no doubt that in the long run the most effective method is to deal with the problem at its origin and improve both the coverage and the quality of primary education. It used to be thought that an expansion of formal education might actually undermine the traditional sector by inducing young people to set their sights on wage-employment. At one time, when graduates of formal education were few and the primary school certificate was valuable in the market-place, this might have been true, but there is no evidence of such a dysfunctional effect persisting once expectations have had time to become more realistic.

Finally, the possibility that skill development is not in fact a critical issue must always be kept in mind. As Liedholm and Mead (1986) have warned, "perhaps the single most important constraint facing small producers, particularly in rural areas, is the problem of finding markets for their output ... policies slanted against agricultural development lead not only to a stagnant agricultural sector, but also to stagnant demand for the products of rural small manufacturers". More generally, Page and Steel (1984) conclude that "more important than direct supply-oriented assistance is the establishment of a policy environment conducive to a growing demand for the goods and services produced by small-scale enterprises. This requires agricultural pricing and other policies that favor incomes at the lower end of the scale, and avoidance of excessive regulation and harassment of small enterprises."

6. NONFORMAL TRAINING

6.1 Nonformal training for the modern sector

Nonformal training embraces all types of institution-based training outside the formal education system. It is typically almost as heterogeneous as enterprised-based training in terms of occupations served and duration of training and it has many types of sponsors. In some countries, notably in Latin America and Korea, the provision of nonformal training may be dominated by a national agency established for the purpose. This is normally linked to the Ministry of Labor but allowed considerable autonomy. In some countries, however, it may be a specialized branch of the Ministry of Education, as in Turkey and Zambia. Even when a national agency has been established, it is unusual for it to have a monopoly. Other sponsors include ministries with specialized training facilities, religious and other non-governmental organizations, trade associations and chambers of commerce, groups of enterprises operating interfirm training centers, and proprietary schools.

The main characteristics of nonformal training are its location in a dedicated training center and an occupation-oriented curriculum in which the academic element, if present, is subsidiary. These features do not set it apart unambiguously from enterprise-based training and formal education: on the one hand, some interfirm and ministerial arrangements do not differ in substance from the vestibule training provided by a large firm; on the other, an industrial training institute for technological occupations may be indistinguishable from a department of a polytechnic. Since the issues relating to the quasi-vestibule training and quasi-academic training are similar to those discussed in Sections 5 and 7, respectively, the rest of this section is primarily addressed to those relating to the generic vocational and technical training typically provided by a national system.

6.2 Strengths and weaknesses of nonformal training

Speed and flexibility of response to training needs

Decentralization of decision-making

There is a tendency for planners to view the unruly diversity of training provision represented by nonformal institutions as a sign of inefficiency which could be ameliorated by the establishment of a more systematic structure. To the extent that the growth of nonformal institutions has been haphazard (for example, the uncoordinated work of multiple donor agencies and local NGOs), this may be so. But the diversity may also be the result of a beneficial ecological process in which the various providers have found their own optimally-decentralized niche.

Indeed the opposite problem, overcentralization of nonformal training in the hands of a national agency, is much more likely to be a cause for concern. In some systems, responsibility is devolved away from the

center. In Brazil, for example, SENAI is administered at the state level. And individual institutions may be given considerable scope for initiative, being allowed to enter into local contracts. But equally it is not hard to cite cases where the management of the agency is both highly centralized and ineffective, with the result that its operations become outdated and irrelevant. The dependence of individual training centers on allocations from an agency budget imparts a bias towards overcentralization, and this is often reinforced by political or institutional factors.

Links with employers

Links with employers confer two types of information feedback of use to nonformal training centers. First, they can provide guidance on the desirable level of enrolment in a training programme which can go some way to making good the vacuum left by the impossibility of making reliable long-term projections.

Second, they can provide guidance on updating the curriculum and the theory/practice balance, and adapting the duration of a training programme to changing needs and technology. Since they can evaluate the graduates of a training programme against workers who have reached them by other routes, employers are in a uniquely well qualified position to give this type of advice. They can also provide counsel on broader policy matters such as trainee selection criteria and trades testing (World Bank, 1986).

In addition, links with employers are essential for programmes involving work-experience and they may facilitate the eventual placement of graduates.

Such links are almost automatic where the training institution is of the quasi-vestibule type. Where training and employment patterns are more complex, the community approach provides a framework of communication for local training providers and employers. It is however most likely to work well where the community is well-defined and the more important information flows readily identifiable.

At a higher and more diffuse level, training providers may establish links with employers (and unions) in the form of tripartite advisory bodies responsible for curriculum development. Examples are the technical committees, consisting mostly of employers, established by the 1984 Carl Perkins Vocational Education Act in the U.S. as adjuncts to the State Councils on Vocational Education, and similar arrangements for the EFG vocational education in Denmark.

However, they often work better on paper than in practice, especially after the initial enthusiasm has been dissipated. The Indian experience is typical in this respect: "the inadequacy of linkage with and feedback from industry to technical institutions and vice-versa has been mentioned by various committees and plans. They state that advisory bodies attached to Industrial Training Institutes, for example, are not fully used nor are their recommendations given the attention they deserve in shaping the content of training courses. The result is a lack of relevance between actual

training and actual requirements, resulting in unemployment of trained personnel" (Nigam, 1986).

Indirect links may be established via the mediation of placement services which gather and disseminate appropriate labor market information. This is a particular strength of vocational education in Hong Kong, Taiwan and South Korea, and a recent survey of training institutions in the Middle East provides further examples (World Bank, 1986).

Adaptability

Compared with enterprise-based training, the kind of institutional training provided by national agencies has a greater risk of being geared towards semi-permanent, obsolescence prone courses. The establishment of a new course involves substantial overheads, both material and organizational: instructors have to be recruited and trained, equipment has to be purchased, accommodation has to be found, a curriculum has to be devised, materials have to be developed, knowledge of the course has to be disseminated to its potential clientele, and not least, its credibility has to be gradually established. All of these factors contribute to momentum which tend to make a course supply-driven rather than demand-driven.

In the short run this may actually be beneficial, in that it gives the course some protection against short-run destabilizing influences. In particular, it helps to sustain the volume of training provision when the demand for graduates is temporarily slack. But in the long run the attenuation of the influence of demand can lead to a failure of the course to adapt its volume and content as needs change.

Another factor which impairs the adaptability of institutional training is the difficulty in replacing redundant resources. Specialized instructors are often difficult to dislodge when their courses become redundant: indeed some types of employment contract, giving tenure and promotion by seniority, seem expressly designed to exacerbate the problem. Likewise it is often difficult to replace obsolete or redundant plant and equipment before the expiration of their planned working life. Even when in economic terms the cost of training equipment is a relatively small component of the total cost, there is an understandable reluctance to incur expenditure on up-to-date technology when existing equipment is still relatively new and working as designed. When the equipment is expensive, the problem is correspondingly magnified, especially when the rate of technical change is fast. Enterprises are less constrained in this respect, both because they may be able to use productive equipment for training and because the cost of dedicated training equipment may be an insignificant part of their total operating costs.

Over and above these problems, there is a well-documented tendency for an institutionalized training provider or system to develop an identity of its own embodied in bureaucratic routines and norms which leaves its staff with little or no incentive to promote change. Little appears to be known about the determinants of institutional rigidity or methods of minimizing its

effects but there does seem to be some evidence that the more complex is the training system, the greater is the potential severity of the problem.

Nonformal training does enjoy one very significant advantage over school-based training: it is not bound to the lockstep of the academic year. This confers two types of flexibility. There is less pressure to equalize the durations of courses for different trades or to make them last exactly one calendar year, or a convenient fraction of a calendar year; and there is much greater flexibility in the scheduling of courses.

It also has one significant potential advantage over enterprise-based training: the training time is much quicker because it includes little or no work experience. In many contexts this may not be beneficial, at least from a social viewpoint, since the quality of the training may be inferior to an apprenticeship which combines the same training via day-release over a longer period of time with work experience and there may be no particular advantage in shortening the total training time. But when there is a sudden surge in the demand for existing skills, or when restructuring or technological change is generating a demand for new skills, the shorter lead time may give nonformal training a decisive edge.

A classic example is the accelerated nonformal training programme mounted by the Overseas Workers Foundation in Pakistan to train Middle East-bound migrant workers (Ghafoor, 1985), a programme which illustrates how a nonformal approach can exploit potential trade-offs between the quality of inputs, the quality of output, and the duration of a course, in this case to minimize the duration. With the imposition of minimum education requirements at different levels for the various occupations, plumbers, steel fixers, welders and auto electricians were trained in 12 weeks; carpenters, domestic installation electricians, and air-conditioning/refrigeration mechanics in 17 weeks; and auto mechanics, civil draughtsmen, and civil surveyors in about 40 weeks.

In a less dramatic form, a desire to accelerate the initial stage of the training has been partly responsible for the conversion of the first year of apprenticeship training in the United Kingdom into a nonformal format. As a result of this and other measures, the length of the apprenticeship has been reduced from the traditional five years to three years in the construction and engineering crafts, again reducing the lead time and, incidentally, making the training programme more attractive.

Innovation

Institutionalized training, particularly institutionalized upgrading training, is commonly seen as the main means of introducing new or improved skills into small and medium enterprises in many developing countries, and as such it commonly attracts the support of donor agencies. It is however subject to three obvious risks.

First, it is often difficult to keep the technical expertise of the staff up-to-date after the institution has been established and the support of the donor agency has been withdrawn. Bilateral ties with overseas

institutions and regional cooperative associations may be of critical importance. In view of the notorious resistance of schools to change, it is probably fair to say that nonformal institutions fare better in this respect.

Second, there is the millstone effect of the reluctance to replace equipment which, though serviceable, has become obsolete.

Third, employers are often conservatively unreceptive to innovations imported by trainees, as illustrated by the following excerpt from an employer interview in Honduras: "I had a bad experience with [the national nonformal training agency]. My workers came back with new ideas and were discontented with their work. I finally had to fire them." (Kelly, *et. al.*, 1985). It may be necessary to train, not just the workers, but also their supervisors and possibly the management to overcome this type of resistance.

Economies of scale

Economies of scale are in principle a major attraction of nonformal training: instead of one journeyman taking time off to train two or three apprentices, one can have a single instructor training perhaps 16 at a time in workshops and double that in a classroom setting. The difficulty lies in achieving these economies of scale. This is an issue which has received surprisingly little attention in the literature. It is clear, however, that efficient utilization is most likely to be secured in urban areas for basic training for mainstream occupations. Furthermore, since space and instructors are inherently less occupation-specific than equipment, efficient utilization is more easily secured for theoretical instruction than for practical training. This last factor is partly responsible for the replacement of old-style apprenticeship by arrangements involving day-release found in many countries.

Selection of trainees

Public nonformal training institutions are seldom in a position to select their trainees, apart from imposing minimum educational requirements. Those sponsored by enterprises will in general have been screened in much the same way as those undergoing enterprise-based training, and there can be expected to be a close relationship between the content of the training and the occupation of the individual, but the remainder will be mostly self-selected and there is a greater risk that they lack the aptitude for the training and that they may never enter an occupation where it is fully utilized.

In some countries considerable efforts are made to enhance self-selection by providing career information which details the rewards and the requirements of occupations. As Lynton *et. al.* (1978, p. 260) points out, it may be important to bring home to aspirant trainees that possibly extensive further in-service training will be required: "trainees who are unwilling to engage in such extensive training and to defer rewards, should be discouraged from enrolling in such programs".

And sometimes training centers aim to reduce the risk of a mistaken choice by arranging the training so that it begins by catering to a cluster of related occupations and then becomes progressively more occupation-specific, as in some apprenticeship schemes, allowing the trainee to defer a final commitment.

Quality of training inputs

Budgets

Irrespective of its merits on other grounds, a training mode cannot be expected to be cost-effective if any component of its budget is allowed to fall below the threshold amount required to make it operational. As the survey of training institutions in the Middle East warns, "countries like Jordan and Egypt which have experimented with control of unit costs have discovered very clear trade-offs between quality of training and cheapness. While margins can indeed be cut to reduce costs, beyond a certain point, cuts quickly become counter-productive, impacting negatively on quality. For example, instructors working long shifts suffer a marked reduction in motivation, teaching standards may fall, the number of accidents increases, and student drop-out rates tend to increase...A final, but crucial point, reinforced repeatedly during the Review is the need to maintain standards in this type of training. This is clearly an area in which there exists an absolute minimum of skill level, below which labor productivity (in a particular job) is unacceptably low. There is, therefore, an overwhelming need to preserve resources to ensure that graduates reach this critical standard. If cutting costs results in depression of quality of graduates beneath this critical level, the efforts to reduce unit costs become utterly self-defeating." (World Bank, 1986).

Nevertheless it is common to find instances of unit expenditures being allowed to fall well below the critical minimum, and publicly-supported institutional training is especially vulnerable (Herschbach, 1985). An example is provided by the government-financed Industrial Training Institutes in India: in 1977 a government committee found that 21% of their graduates were unemployed, despite a widespread shortage of skilled workers in the appropriate trades, a fact ascribed to "the poor quality of education and training at some Industrial Training Institutes where tools and training materials have been reported lacking, along with inadequately qualified instructors" (Nigam, 1986).

The cause of this underfunding is not an overzealous desire to reduce unit costs as such--indeed it is unusual to find that the institution has calculated them--but a retrenchment in the budget forced by recession and a fall in public revenue or, on occasion, by a failure to make an accurate estimate of the recurrent cost in the first place. As Herschbach (1985) observes, donor agencies are sometimes partly to blame: "Although the host country bears direct responsibility for expanding programs without sufficient resources, the donor agency generally does little to prevent the foreseeable consequences...Although many Third World countries cannot afford to take on any additional obligations, few of these countries resist donor assistance, and some actively seek it."

Reluctant or unable to reduce student rolls and lay off staff, administrators first cut the budgets for consumables, maintenance and other operating expenses. Since these are in any case minor items in comparison with the pay-roll, the effect of even a relatively small reduction in expenditure can be devastating. A reduction in the budget for consumables leads to hands-on practice in the workshops being supplanted by blackboard instruction. A reduction in the budget for maintenance drives up long-term unit costs by causing a premature need to replace buildings and equipment, "a widespread problem in most developing countries, causing training costs to be extremely high and to reach levels that would not be tolerated in developed countries." (Herschbach, 1985).

In extreme cases, the dependence of nonformal training centers on general revenue can halt their operations entirely, as in the case of the Punjab Technical Training Centers in Pakistan, which exhausted their annual budget in the first six months of 1984 and had to cease operations for the remainder of the year (Klein, 1985, p. 297).

Instructors

It seems to be the rule rather than the exception that the cost-effectiveness of publicly-supported training institutions is adversely affected by inappropriate instructor salaries and conditions of employment.

It is also common to find public sector instructor payscales set below market rates, especially in developing countries and especially in times of recession. Given a budget which is diminishing in real terms and the choice between a market-wage, reduced establishment policy for instructors, with correspondingly reduced student roll, and a low-wage, high establishment policy, it is next to impossible for public sector administrators to opt for the former if this means involuntary redundancy. The result all too often is that instructor salary levels are allowed to become so unattractive that only the least competent are not bid away by productive enterprises, with the result that the training becomes ineffective.

Even when budgets are not underpressure, training institutions may find themselves overloaded with underqualified staff, especially administrators. Herschbach (1985) observes that "receptive to their political constituencies, government officials staff training programs to fulfill commitments, often giving scant attention to qualifications. Administrative jobs may be created as political plums, and other jobs filled on the basis of loyalty, political affiliation, or ethnic or tribal origin...Although the ratio of administrative staff should be about 1:4, it is not unusual to find ratios that are considerably higher, in some cases approaching or exceeding 1:1. The ratios of instructional staff to pupils tend to be low. An instructor with one or two assistants may serve a class of ten to fifteen students."

In short, staffing problems are one of the major areas of vulnerability for institutionalized training programmes, and unfortunately,

although exceptions abound, in many developing countries management has neither the will nor the power to address them.

Provision of work experience during training

The fact that nonformal training programmes tend to be relatively short compared with other modes militates against the inclusion of work experience in them: there is often little to be gained from making such arrangements when a few months, or perhaps weeks, later a future employer will of his own accord provide experience which is more relevant to the job in question at a much lower administrative cost.

Placement

Where nonformal programmes are used for in-service training, the problem of subsequent misplacement in principle ought not to arise. This is one of the major advantages of the lifelong training approach over any approach stressing pre-employment training. Good placement should also be expected for short pre-employment courses where labor market conditions and the commitment of the individual have little time to change during the interval between the decision to undertake training and graduation.

Low placement rates may however be a problem for extended pre-employment programmes, especially where these recruit young people who have been denied access to further formal education. As many commentators have pointed out, it is common to find such trainees attending evening classes with the intention of obtaining educational certificates and re-entering formal education.

Accountability

Accountability of the training establishment

The accountability of the training establishment is heavily influenced by the mode of financing. The three main sources of finance for nonformal training are general public revenue, sector-specific taxation, and direct fee payments, sometimes reimbursable via levy/grant schemes, by firms or individuals.

Generally, nonformal training managed by national agencies is heavily subsidized and the weakening of accountability resulting from its insulation from market pressures is seldom rectified by other mechanisms, especially when the agency enjoys virtual autonomy. The problem is often exacerbated in the case of finance by means of a sector-specific tax by the rate being set at a level which generates more revenue than the agency can efficiently spend. The outcome may be the encouragement of a growth of top-heavy administrations and a tolerance of ineffective programmes with high unit costs.

Accountability of the trainee

The accountability and performance of the trainee are in principle assured by selection, either by a sponsoring firm or self-selection, and by end-of-programme trade tests.

6.3 The scope for government intervention to promote nonformal training

The establishment of a central agency

As in the case of enterprise-based training, the most common and significant government intervention to promote informal training is the establishment of a national agency for this purpose, the same agency often being responsible for both modes. As has already been noted, it is unusual for its domain to include all of the heterogeneous types of nonformal training provision, even within the public sector. Its role may range from the relatively passive one of acting as a registry for a system of semi-autonomous nonformal training centers and monitoring their compliance with legislation, to executive control of training provision within its ambit. In general there appears to be a maturation process in which the more successful agencies gradually become more decentralized and complex.

Financial support

The provision of financial support for training, often channelled through a national agency, is an almost equally common intervention. As noted in the discussion of accountability, the beneficiaries may pay for the training, but it is frequently subsidized or even wholly financed by grants from public revenue or by levies on the sector employing the trainees. The support is usually limited to the establishment of the training facilities and the payment of their recurrent expenditure. On occasion, however, it may be extended to payments to trainees, as in the case of the publicly-owned Industrial Training Institutes in India, where one third of trainees receive stipends (Nigam, 1986).

Various arguments are used to justify public support. One, used to justify support from general public revenue, is that the state should assume responsibility for all forms of skill development, particularly before entry into the labor force, and hence should subsidize nonformal training in the same way as formal education. Another is that economic fees may be beyond the means of individuals seeking pre-employment training. A third is that such support gives a training center a measure of stability which would be absent if it had to rely on fee payments and the entrepreneurial ability of its manager.

General public revenue

The financing of nonformal education from general public revenue is relatively uncommon. Since the cost of training is not borne by the beneficiaries, accountability may be weak, with consequences noted above;

incentives to correct an oversupply or undersupply of training provision may be feeble; and in times of recession, training provision may suffer as part of a general retrenchment of public expenditure.

Sector-specific taxation

The commonest type of sector-specific tax is a payroll tax levied on all establishments exceeding a certain size. The tax is often set at 1% of payroll, but sometimes the rate is higher, as in the case of the National Bureau of Vocational Training in Cote d'Ivoire with 1.5%, and of SENA in Colombia with 2%. Other examples of sector-specific taxes are the 0.25% levy on the value of construction contracts worth more than HK250,000 established in 1976 to finance basic training in the construction trades by the Hong Kong Construction Industry Training Authority, and the 0.03% of the value of textile exports received by the Hong Kong Clothing Industry Training Authority (APSDEP, 1981a).

Financing via an ear-marked sector-specific tax has three advantages over financing from general revenue: the resources are sheltered from pressures to cut back general expenditure, the costs are more closely borne by the beneficiaries, and the tax may constitute a means of mobilizing financial resources otherwise inaccessible to the public sector. For these reasons it has been adopted very extensively, sometimes as part of a levy/grant scheme.

In practice the advantages are sometimes less clear-cut. In the first place, as in the case of any earmarked tax, the proceeds may be subject to diversion. For example, SENAI in Brazil currently receives significantly less than the amount collected in its name.

Second, although the cost of training may be borne by a specified sector, there is usually no close relationship between bearing the cost and benefiting, and many enterprises will be paying for training which will never be of any benefit to them, direct or indirect. Third, the payroll tax for training constitutes a mobilization of net additional resources for the public sector only if its imposition for other purposes would be politically infeasible and if there is no other taxation of company income. If the latter condition is not satisfied, it may in fact constitute an erosion of the company sector tax base.

Non-financial measures

Various types of non-financial measures may be used to promote nonformal training. For example, graduates of nonformal training programmes in Korea may be exempted from military service.

6.4 Nonformal training for small enterprises and the traditional sector

Nonformal training programmes for the informal sector are almost invariably addressed to the in-service upgrading of skills rather than pre-employment training, of short duration and usually part-time. As a consequence there is considerable overlap between them and the enterprise-

oriented interventions discussed in the previous section. The issues are therefore much the same. The general view is that the more distinctively nonformal is a programme, as opposed to being enterprise-based, the less likely is it to be cost-effective (Bas, 1987). The following account of a programme in Thailand, which draws on Marsden (1984), is representative.

The Department of Industrial Promotion (DIP) in Thailand: The DIP employs about 1,000 staff and engages in: training, extension and advisory services in the light engineering fields through Industrial Service Institutes in Bangkok and Chiang Mai; similar services for textile producers through its Textiles Industry Division; training for handicrafts and cottage activities through its Handicraft Promotion and Cottage Industries Divisions; conducts business-skill seminars and training courses through its Industrial Productivity Division; and operates a loan programme for small-scale enterprises through its Small Industries Finance Office.

Marsden's evaluation illustrates graphically how large a gap can exist between programme design (in this case, aided by ILO and UNIDO experts for several years) and impact: "Considering the size and relatively long establishment of these government programmes, the services available were remarkably little known to the enterprises visited. Most had never heard of the Industrial Service Institutes or the DIP...The impression left behind after discussions with the principal officers and division heads of the DIP, and visits to their workshops, classrooms and offices, was that some of the functions described above existed more on paper than in reality...No courses were being carried out at the time of the survey. Although about 1,000 persons had participated in training programmes during the previous financial year, most of these programmes had lasted for only a few weeks. A significant proportion of the trainees were the DIP's own extension staff."

To some extent these shortcomings could be attributed to low salaries for instructors, the consequent recruitment of inexperienced instructors, and inadequate budgets for operating costs, particularly materials, and hence they were potentially remediable. But Marsden concludes that the effects of inadequate finance masked the deeper-seated and more intractable problem of providing relevant technical expertise to a heterogeneous clientele: "The problems experienced by small firms are specific to the products produced and the materials and machinery used. Rapid changes and innovations take place in all three areas. Advisers must be familiar with these developments and be continuously involved in the industries concerned before they can make reliable diagnoses of problems and suggest appropriate solutions which carry conviction with established entrepreneurs, who have mostly gone beyond the stage when advice based upon general principles or theoretical knowledge is of value to them...since the range of expertise required to cover the needs of all types of small-scale industry is very broad, institutions such as the DIP cannot afford to hire or retain a qualified staff of specialists to cater to more than a fraction of the trades in which small firms are engaged."

The inability to deliver technical expertise was compounded by a more general lack of know-how, which manifested itself in a willingness to accept at face value problems described by entrepreneurs and "too ready an

assumption that these problems should be tackled by direct government intervention without questioning whether the government has the capacity or the resources to deal with them" rather than by promoting the use of market networks through fiscal incentives or other measures.

7. SCHOOL-BASED TRAINING

7.1 The scope for vocational education

One of the problems that bedevils almost any discussion of the appropriate role of vocational education in skill development is the failure, on the part of both advocates and critics, to clarify what is meant by it. As has been noted in the Introduction, the term covers a continuous spectrum which ranges from the teaching of applied science subjects like electronics and which, while technical in nature, are of wide application, to the development of job-specific skills. It is also used on occasion to cover the vocational guidance and preparation for work which is a significant part of the secondary curriculum in some countries.

It follows that one needs to exercise the greatest circumspection when evaluating the absorptive capacity of the labor force for vocational education graduates. The broader and less occupation-specific the definition of vocational education, the greater the absorptive capacity is likely to be.

This discussion will begin by focussing on the occupation-specific end of the spectrum. The reason is that this type of concept appears to be in the mind of the majority of its advocates in developing countries, both those who are demand-oriented and have promoted it in response to "training needs" analysis derived from manpower planning exercises, and those who are supply-oriented and have promoted it as a means of mitigating the problem of youth unemployment by equipping school-leavers with employable skills.

One of the safest generalizations that can be made with regard to training is that there is a tremendous tendency for the supply-oriented advocates to overestimate the absorptive capacity of the labor force for occupation-specific pre-employment training in general, and of occupation-specific vocational education in particular. One can cite dozens of official documents unquestioningly asserting the need for vocationalizing formal education on a massive and wholly unrealistic scale.

The Indian National Policy on Education 1986 and the Somalia Five Year Development Plan 1982-86 are typical examples. The Indian Plan documents (India Ministry of Human Resource Development, 1986a, 1986b) state that "the introduction of systematic, well-planned and rigorously implemented programmes of vocational education is crucial in the proposed educational reorganization. These elements are meant to enhance individual employability, to reduce the mis-match between demand and supply of skilled manpower...", and the objective is to vocationalize 25% of higher secondary education by 1990, a more modest objective than the 50% target set by the Kothari Commission twenty years previously but substantial nevertheless.

The Somali Plan document states that 42% of primary school graduates will proceed to secondary vocational school, and a further 14% to secondary technical school, by the end of the plan period. "The aim is to ensure balanced and purposeful education for primary school leavers and to overcome the shortage of middle-level technicians and skilled and semi-skilled workers

in key sectors of the economy. It will be necessary to open new schools and strengthen and upgrade existing technical and vocational institutions" (Somalia Ministry of National Planning, 1982, p. 310; for further examples, see Psacharopoulos, 1987).

But this type of rhetoric merely reflects wishful thinking about how to find employment for an exploding population and calls for extreme skepticism. It is not based on manpower analysis, a practical knowledge of training needs, or an understanding of how employment is actually generated.

Most entry-level occupations need relatively little training. This automatically makes mass pre-employment schemes highly wasteful. Not surprisingly there is more information in developed than developing countries concerning the amount of training required by entry-level workers. Perhaps the most reliable estimates are those for the United States based on the National Longitudinal Survey of the High School Class of 1972, which showed that 87% of the graduates employed needed less than three months of training, and most of the remainder needed less than six months (Sherman, 1983). Similar findings were reported by an earlier study by the U.S. Department of Labor: only 30% of adult workers in the U.S. labor force reported that they were using any skill acquired in formal training or specialized education, and only 12% said that it had been more useful than other forms of training; even among craftsmen, foremen and kindred workers the corresponding figures were only 41% and 17% (U.S. Department of Labor, 1964, Table 11).

Obviously other figures would be found in other countries, but it is not reasonable to believe that in most the situation would be materially different. Indirect evidence of the limited capacity of labor markets for the graduates of vocational programmes is provided by their low placement rates, as revealed by tracer studies.

7.2 Strengths and weaknesses of vocational education

Speed and flexibility of response to training needs

If nonformal institutional training is less responsive to changes in perceived needs than enterprise-based training, school-based training is as a rule less responsive still.

Decentralization of decision-making

The capacity of individual schools to respond to changes in training needs is critically affected by the degree to which decision-making generally is decentralized within the education system. In particular, it depends on the latitude given to schools for modifying their curricula and for embarking on initiatives involving outside entities, especially local employers.

As a general rule, the degree of decentralization depends in turn on the source of finance for the school. If the school system is financed out of central government revenue, as in many countries, decision-making tends to be concentrated in the Ministry of Education and responsiveness accordingly is weak. As a case in point, the World Bank (1986) survey of training in the

Middle East concludes that, while the initiation of change in most institutional vocational training and technical education systems is extremely difficult, it is particularly hard when it is run by large bureaucracies like the Ministry of Education or other traditional mother institutions.

Where finance is locally-raised, schools tend to have more autonomy and be more flexible. An extreme example is provided by the locally-financed community colleges in parts of the United States which have an established track record of good coordination with local employers. The success of a decentralized system does depend upon the availability of managerial and technical skills.

However, if the local authorities or institutions do not have the required expertise, decentralization can have unsatisfactory consequences. The current Somalian experience provides an example. Vocational schools are expected to devise their own curricula and submit them to the Ministry of Education Curriculum Development Centre for approval. Almost all of the instructors developing curricula entered their profession directly from school and have no experience of earning a living in their trade, and they have no training in instructional design. The result is that the instruction is not based on occupation or task analysis, and has no systematic core. Consequently it is of doubtful relevance for employment, and courses with the same name differ widely in content and standards among institutions (Somalia Ministry of Planning, 1984).

Links with employers: feedback information, resources and graduate placement

The more occupation-specific is the training provided by schools, the more important it is for them to have good links with local employers, for much the same reasons as for nonformal training institutions. First, they can provide feedback information useful for keeping the volume of training at a desirable level and its content up-to-date. In the absence of such links, it is common to find that the training is unrelated to labor market conditions. Indeed educators sometimes disregard labor demand to the point of blithely assuming that skill development is a necessary and sufficient condition for employability.

Second, links with employers may yield several types of resource benefits. They may facilitate the provision of work experience for students, which is often crucial for the quality of a training programme. They may also lead to employers becoming directly involved with the school-based component of the training, seconding employees part-time as instructors and providing materials and even equipment. Not least, the contacts may lead to the generation of fee income for the training provider. All of these benefits accrue from the close relationships between secondary workers schools and enterprises in China (Noah and Middleton, 1988). Kelly and Palmer (1985) and World Bank (1986) give examples of training centers in Bangladesh and the Sudan, respectively, earning as much from services to local industry as they received in public funds for their mainstream activities.

In most developing countries, however, the difficulty of establishing and maintaining effective working links with employers is potentially

a major vulnerable point in institutionalized training provision, and in particular, school-based training. It is a problem that can be overcome, as the Middle Eastern examples cited by World Bank (1986) show. But when conditions are less favorable, it is a powerful reason for confining school-based training to generic technical education for which the linkage issue is less important since it is less directly related to the labor market than job-readiness training. As Herschbach (1985) observes, "organizing formal programs to provide more generic training, coupled with available short-term training at the work site, is not a new idea. It is one that has been advocated for at least two decades by program planners, but it is an idea given little attention in discussions about formal vocational programs and lack of linkage between supply and demand."

Adaptability and innovation

Schools are notoriously resistant to change. Partly this seems to be an inherent characteristic of formal education. The explanation of Shah, Prakasha and Nischol (1986) of the resistance to the vocationalization of secondary education in India puts it well: "the point must be made that despite more than 50 years of intense lobbying, this particular school reform to make manual activity a regular part of the school programme has not struck root with the result that in most of our schools, there is hardly any proper provision for well-planned serious practical work today (society) may be, we must not forget that schools are devices essentially to preserve and perpetuate the culture of a society, and not for creating a new social order; as instruments of change, they are too slow and ill-adapted for such a complex and gargantuan responsibility."

Partly also the resistance to change is attributable to their mode of operation. As McCulloch, Jenkins and Layton (1985) observe, "university requirements, examination syllabuses, teacher training, textbooks and equipment are all bases of negative feedback loops operating against change". And in addition to the negative feedback, there are rigidities not found in other forms of training. The lengths of courses are determined by the lockstep of the school year, rather than by actual training needs, and the school setting impedes the modularization and individualization of training.

In view of the widespread consensus that, from this point of view at least, the role of the schools should be confined to general education, the Evaldo Lodi technical school in Rio de Janeiro, described by de Oliveira (1988), merits especial attention. The school dates from 1971, enrolls about 3,000 students per year and its present arrangements are now well-established. There are no classrooms and the teachers, who work two four-hour shifts (the same as in conventional technical schools in Brazil), supervise students individually. Teachers have maximum student-loads, but the identities of their students will change as some drop-out and their places are offered to others. Theoretical instruction is received from worksheets adapted for individualized instruction and supplemented by guidance from the teacher; similarly shopwork and laboratory work is undertaken on an individual basis within prescribed hours with background supervision.

The advantages of this type of operation are: flexibility in the timing of training--students do not have to enrol at the beginning of a school year and do not have to commit themselves to completing the training in one session; efficiency in the utilization of resources--as one student drops out or terminates, he is replaced by another; and a distributed flow of graduates throughout the year rather than a batch at a single date.

Economies of scale

School-based training has a potential for exploiting economies of scale similar to that of nonformal training. In practice the fact that the trainees' time is only partly devoted to training, as opposed to general education, makes the realization of the economies of scale considerably more difficult. The fact that students spend a much smaller proportion of their time in workshops in school-based training than in nonformal training means that, unless school enrollments are much greater than nonformal training centre enrollments, the shops, and their instructors, can be expected to have a relatively low utilization rate.

Selection of trainees

Failure to select trainees for motivation and aptitude can have a significant negative impact on both the internal and external efficiency of a training mode, contributing to high drop-out rates and a failure of graduates to seek training-related occupations. This is most likely to be a problem with secondary vocational/technical education in that it is commonly entered by students who would have preferred to have remained in academic education but were denied access. The problem is particularly acute in those developing countries where students enrol in vocational schools only because there is a shortage of places in general secondary education. Even where students enrol in vocational education by choice, their youth and immaturity have an adverse effect on the likelihood that they can predict their future careers with sufficient accuracy to be able to make appropriate choices for themselves--and school administrators may be no better placed to make decisions on their behalf, even if they had the power and motivation to do so.

Quality of training inputs

Instructors

Schools typically have the utmost difficulty in recruiting competent instructors. A UNESCO survey of the experience of 23 developing countries (UNESCO, 1978, p. 105) states that inadequate teaching staff is a major problem common to virtually all the countries under study.

Bureaucratic constraints often result in instructors having inappropriate qualifications. The Asian experience, summarized by Chandrakant (1980) is representative: "an over-emphasis on academic qualifications, such as degrees, has brought into the teaching profession a large number of persons with little or no industrial experience. As a result, much of the learning in technician institutions is theoretical, out of text-books, and lacks adequate practical content and application."

It is equally difficult to keep the technical expertise of instructors up-to-date. Even one of bodies most ardently advocating vocational education in the U.S. concedes that "problems plague in-service training for vocational teachers, administrators and teacher educators" (National Commission on Secondary Vocational Education, 1984).

Many of the problems surrounding instructor recruitment and retention stem from the determination of their salaries with reference to bureaucratic norms rather than to market conditions. In some cases this can actually lead to an inflation of salaries, and hence unit costs, evidence being furnished by comparisons of salaries in public and proprietary programmes providing similar training. For example Wilms (1975), in a representative comparative analysis of training for selected occupations (accountant, data-processing programmer, dental assistant, secretary, cosmetologist) in the U.S. in 1973, found that public post-secondary (non-college) schools paid their instructors salaries which were 40% to 60% higher than competing proprietary schools, which kept their levels just above the market rates for the corresponding occupations.

The public schools, unlike the proprietaries, departed further from market norms by allowing their instructors to teach for only 9 months of the year and giving them relatively light weekly teaching loads--averaging 18 hours per week, as opposed to the proprietaries' 27 hours per week. Taking these factors into account, Wilms concluded that the cost of teacher input was several times greater in the public schools than in the proprietary schools.

To arrive at an exact comparison one would need to take account of the fact that proprietary courses are more intensive, but shorter, than public training, and one would also need to take account of possible differences in the quality of the instruction. In Wilms' study there did not appear to be any major differences in the labor market effectiveness of the training, but it is clear that there were systematic differences in the clienteles of the two types of institution, those attending proprietary schools coming from families with lower socioeconomic status and sometimes being screened for aptitude. Teachers at the proprietary schools had less credentials but more likely to be hired, retained and promoted on the basis of demonstrated teaching ability.

In many developing countries the problem is the reverse: bureaucratic norms lead to salaries being set so low that there is a chronic loss of competent instructors to industry, if they can be recruited in the first place. As the UNESCO study observes, "in most of the countries, the technically qualified are few in number to begin with and are much sought after by business and industry where salaries are such that the education system can rarely compete for the services of these people". This problem is also encountered by nonformal training providers and its implications are discussed in Section 6.

Equipment

The provision of proper facilities for practical training is also cited by the UNESCO survey as a major problem faced by school-based training: "equipment for the industrial fields of technical and vocational education is very expensive, both in terms of initial investment and in terms of maintenance. Many countries also have to import this equipment, which is doubly costly and difficult to maintain because of difficulties in obtaining spare parts. Furthermore, imported equipment is often not really adapted to the learning requirements of the students" (UNESCO, 1978, p. 106).

Schools are almost invariably under budgetary pressure not to replace expensive equipment within its design lifetime, even if it has become technically obsolete. Even in the United States, where school-based training is comparatively well-financed, this is a problem: "The kind of high-tech equipment now used in industry is not only very expensive, but the rate of obsolescence in such fields as computers and semiconductors is so high that companies themselves are often hard-pressed to keep up with the state of the art. Under these conditions getting the latest equipment into the schools is extremely difficult" (Perelman, 1984).

These remarks were made in the context of school-based training for higher-level technicians. Where the training is for craft-workers and lower level technicians, the pace of change is slower, but even so in many developing countries the severe constraints on budgets result in creeping obsolescence which is difficult to reverse.

Provision of work experience during training

The quality of the school-based training suffers from the difficulty of exposing the students to realistic work experience. Except in those cases where schools are actually owned or managed by enterprises, schools encounter great difficulties in establishing and maintaining cooperative schemes with industry. This adversely affects both the relevance of the training and the motivation of the trainees. Similar problems affect nonformal institutionalized training, but they are more severe for pre-employment school-based training because school programmes tend to be much longer, often spread over two or three years, and there is a greater delay between receiving the theoretical instruction and putting it into practice.

Recognition of the importance of work experience is reflected in the highly-organized work experience provided in Swedish vocational education; in the introduction in 1979, following employers' criticisms of the isolation of the schools, of "alternance" training into French vocational education; in the rapid expansion of cooperative vocational education programmes in the U.S. in the 1960's following the establishment of the National Commission for Cooperative Education and the 1968 amendments to the 1963 Vocational Training Act requiring part of federal grants to states for vocational education to be used for the initiation of work experience programmes; and in the sandwich format (a degree course including a year in industry) adopted by the Diploma of Technology established by the National Council for Technological Awards in the U.K. in 1956, to cite just four examples.

In addition it has received endorsement from a number of international bodies including the European Communities and Unesco. The EC Council resolution of 18 December 1979 (reprinted in Jallade, 1982) states that it is necessary to adapt vocational training systems and that "such adaptation can be especially encouraged by developing linked work and training, that is to say the inclusion, during the period of transition to working life, of periods combining training and practical work experience". The Unesco 1974 Revised Recommendation concerning Technical and Vocational Education only suggests that alternance training "should be considered", as an alternative to full-time institutionalized training.

However, despite the potential benefits accruing to both the school and collaborating local enterprises, successful, sustained work experience programmes are the exception rather than the rule.

Their establishment and maintenance require leadership on both sides of the fence and a willingness to bear potentially significant psychic costs. Any form of interdependency involves a loss of autonomy and hence a loss of freedom of manoeuvre (Easterline, 1976). The mutual benefit--the key to a healthy collaboration (Maurice, 1981)--may be reduced by the compromises needed to reconcile divergences in objectives, while accountability on both sides is weakened by the absence of an immediate and tangible quid pro quo in the transaction.

Not least, the direct cost of work-experience training and the managerial costs of coordination may be a non-negligible disincentive. Some studies have concluded that the net direct cost, after taking account of the output of the trainee, may not be a significant burden on the employer, or that there may even actually be a net saving.

For example, a pilot study by Wilson and Brown (1985), based on two employers of Northeastern University cooperative students and 30 students, found that both employers were making significant savings in aggregate, saving being defined as (regular employee salary x relative productivity of the cooperative student x index of quality of the output of the cooperative student) less cooperative student salary. Similarly, in a parallel study using the same definition of saving, Klawitter (1986), using a sample of 30 Canadian employers and 53 cooperative trainees, found that the employers made net savings on about 80% of the trainees. The definition of saving does not, however, take account of the relatively high rate of turnover of cooperative students and the associated extra hiring and initial training costs, nor does it take account of any extra supervisory or evaluative requirements.

But the cost of effective coordination--and the importance of effective coordination--are not disputed. And effective coordination is crucial: one of the main criticisms of the British Diploma of Technology was the difficulty in establishing an effective integration of the school-based and industry-based components (Smithers, 1976).

Accountability

Accountability of the school

The fact that schools do not in general attempt to impart job-readiness training means that it is hard, or impossible, to measure the effectiveness of their training by any objective standard, and hence it is equally difficult to hold them accountable for the resources consumed. Even placement rates in appropriate occupations are not necessarily unambiguous indicators of the impact of the training, as will be discussed below. Often the only significant pressure for accountability comes from employers, but this is sometimes undermined by the weakness of employer representation in, or its absence from, school policy-making.

Accountability of the trainee

For the same reasons, trainee accountability is also weak. The fact that evaluations of student performance on the more practical parts of the curriculum are not given the same weight as examinations on the academic components, particularly in university requirements, almost guarantees that less effort will be applied to them, even when students are not prejudiced against them. Attempts to rectify the situation by introducing trades tests, as in Somalia (Chapman and Windham, 1985), have generally not been successful, the main consequence being to distort the curriculum and make the double role of the school even more ambiguous.

Placement

A major factor affecting the cost-effectiveness of any mode of training is the extent to which trainees use it, not as a qualification for a job, but as an inefficient stepping stone to some further form of training.

School-based training is particularly vulnerable, a very common example being the hijacking of secondary vocational or technical schools for use as expensive substitutes for secondary academic schools as pathways to higher education. In some countries secondary technical schools produce hardly any technicians, the majority of the graduates proceeding sooner or later to enrol in universities or other post-secondary institutions. This seldom seems to be predicted when the schools are established and commentators frequently suggest, with some truth, that the authorities have allowed themselves to become confused over the roles of the schools.

In fact, confused or not, the authorities are typically helpless in the matter, especially if the proportion of each age group completing any type of secondary education is small. As Castro (1979) points out, "the aim of offering vocational and technical education within the academic cycle is frustrated by the fact that students have no interest in occupations that offer status levels lower than those they can reasonably aspire to, given the schooling level they have reached." Similarly, Corvalan (1986) observes that "to the extent that those children who reach the upper level of secondary education represents one-fourth of their cohort, they will continue to see

themselves as a privileged group headed to university. Practical training offered to them seems useless."

The attitudes of students are often reinforced by those of the schools themselves: "secondary schools, at least 80 per cent of whose pupils are middle class, exhibit a totally prejudiced group attitude towards technical and manual occupations, even highly skilled ones. As a result, middle-class children come to develop a disdain for these occupations, totally thwarting all efforts to "vocalionalize" middle-level education, and the few children of workers who reach that level at all adopt the values of their middle-class peers and reject their fathers' occupations" (Castro, 1979).

The situation is exacerbated if higher education has minimal admission requirements, charges low or no fees, and is of low quality. With the emphasis on mathematics, science and technical drawing in their curriculum, the graduates of well-run schools find themselves just as well equipped as the graduates of secondary academic education for certain types of technically-orientated higher education and with a hop, skip and a jump they are off to university, lured by the prospects of superior career development and prestige. If an attempt is made to make the graduates legally ineligible for entry to higher education, social pressure ensures that it comes to nothing or, as in the case of the Brazilian reform of 1942, is of short-lived effect (Gallart, 1986).

In Honduras, for example, according to a 1985 donor agency report, the graduates of the three secondary technical schools are welcomed by the National University's engineering department because they have had some exposure to practical work in addition to their formal education, and it is clear that most of the students entered the schools in the first place only because other pathways to the university were closed to them by the rationing of secondary academic places in public schools and by the cost of private schools.

The consequence in such cases is that vocational education cannot be expected to be cost-effective, since it achieves little or no more than secondary academic education at a higher cost and possibly with a higher drop-out rate.

In some cases authorities have attempted to block the access to the university by increasing the practical part of the curriculum at the expense of formal education to the point where the graduates are clearly not prepared for admission to higher education. But this attempt to create a barrier meets the same social resistance, and typically the same fate as the legal method. In fact the converse appears to be more common, terminal technical schools being upgraded to the point where they become non-terminal, as has happened in Argentina (Gallart, 1986), or else becoming abandoned by their intended student body.

Exactly the same social pressures typically greet, and undermine, attempts to transform secondary academic schools into vocational schools. School authorities and parents, knowing that further opportunities for the children depend on their ability to satisfy admission requirements for

post-secondary institutions, and not on their proficiency in practical work, combine to thwart a whole-hearted implementation of the vocational curriculum, with the result that the schools remain academic schools in disguise.

Typical examples are the failure of the 1971 reform in Brazil (Piletti, 1984; Gallart, 1986) and the recent experience of Sierra Leone (Wright, 1986). In the Brazilian case, "the reform was difficult to implement even in the richest state, Sao Paolo. Some schools retained their old curricula by cheating. Under the cover of new names they kept the old subjects. Others chose "easy" vocational fields without taking into account labor market requirements in order to allow the students to concentrate their study for university requirements" (Gallart, 1986). Attempts to make technical or vocational subjects more attractive by enhancing their social status cannot be expected to have much effect under these circumstances:

Such distortions may have both a positive and a negative influence on cost-effectiveness. If the vocationalization is implemented, schools can be left with high-cost facilities which are underutilized. On the other hand, if the resistance is so successful that the implementation, in terms of constructing workshops and hiring instructors, is token, it may help to reduce expenditure which is likely to be wasted anyway once the graduates leave school.

One solution to the problem is to make higher education genuinely selective, so that although secondary technical graduates have the right to apply for admission, only a few are accepted, as in Turkey. The likelihood of this solution being successful is increased if social demand for higher education is blunted by making the private contribution to its cost non-trivial. It is also more likely to be successful if the university curriculum is rigorous and weaker students are deterred from seeking admission by the knowledge that they will be unable to cope.

7.3 Employers' views

Some of the most telling evidence against the provision of pre-employment job-specific training comes from surveys of employers' opinions. There is a striking contrast between their unbounded enthusiasm for vocational guidance and their lack of enthusiasm for job-readiness training. Other things being equal, employers typically state that they would like entry-level workers to be better qualified all round--to be better equipped with basic skills, employability skills, and a knowledge of technical theory. Occasionally job-readiness training is added to the list, but is rapidly discarded when priorities are discussed; more often, it is actually discouraged.

Quite typical is one finding of an in-depth survey of New York employers conducted by the Labor Market Information Network during the years 1978-81. It is of particular interest because it addresses both the distinction between technical education and technical training within the field in question and the complex problem of how to devise a programme which will cater to those of different ability and motivation:

"An example [of a preference for more general training than is currently provided] is provided by those groups that met to discuss various occupations based on or related to pre-employment preparation involving electricity and electronics. They included the Task Forces on Advanced Business Machines, Interconnect Telephone, and Major Appliance Repair, and were supplemented with observations by employers whose jobs ranged in technical complexity from alarm services to the maintenance of bio-medical equipment. Without exception, these employers agreed that subdividing such training into occupational specialties at the high school or manpower level is wasteful of both physical and human resources. They would prefer, they said, an electricity or electronics core curriculum from which either ability or preference could lead individual students to their maximum potential in both personal and labor-market terms. Low-level departures from such a core, they thought, could lead to such occupations as appliance or typewriter repair, or into apprenticeships for electrician or computer maintainer. An alternate track for the higher-level occupations could be post-secondary educational institutions, particularly those employing cooperative education formats. A particularly strong aptitude and preference could be developed, on the basis of such a core, into engineering training in one of the electrical or electronic concentrations, or could combine such training with a desire for hands-on involvement in such a field as the maintenance and/or modification of advanced bio-medical or laboratory research equipment. Such options, the employers said, are foreclosed by the inflexibility of both curriculum and instructional staff in the present specific-occupations format." (Lynton, 1979).

Japanese employers place even greater emphasis on general education. A recent survey reports "major employers have no interest in vocational education attainments. They do not want 15 year olds, and are indifferent to vocational education courses at the postcompulsory stage...As a result the school system does not expect to concentrate on vocational education. There is none at the compulsory level and even in vocational courses provided in senior high schools the specialized subjects occupy only 30% of the syllabus and are not normally designed to impart immediately usable skills...The purpose of education is clear-cut. It provides what the dominant voices in industry and commerce want, in the national interest, and generally does so to their satisfaction. It is regarded as socially, politically and economically efficient. It is not regarded as an appropriate provider of anything looking like training. Vocational education is now provided half-heartedly, for those unable to compete academically...The emphasis in education is towards even greater generalization, rather than specialization". (Hayes, Anderson and Fonda, 1984).

Similar conclusions are reached in a recent World Bank study (Inoue, 1985) and by Reubens and Harrison (1980), who attributes the development of enterprise-based training in prewar and wartime Japan to a failure of public vocational schools to keep up with technological change and a consequent disenchantment of employers.

In Britain, France and Germany, Noah and Eckstein (1986) report that employers see the need for vocational education, but only in the sense of

guidance and perhaps as an antidote to the disparagement of business in the schools. In Britain for example, a memorandum of the Confederation of British Industry to the House of Commons Committee on Education, Science and Arts stated that "employers...strongly support the case for vocational elements within the school curriculum, particularly in the later years of compulsory education. By this we do not mean specific vocational courses as an entry into particular trades or occupations, but a general vocational approach leading to an orientation across the whole of school life which encourages the development of attitudes, skills and knowledge of relevance to adult society...we believe that young people should leave school with an adequate understanding of how wealth is created in our society and an appropriate evaluation of the essential role of industry and commerce" (cited by Noah and Eckstein, 1986).

These sentiments are echoed by the Association of British Chambers of Commerce declaration that "Industry prefers to manage the provision of training itself and sees the job of schools as providing a foundation on which training can be based, supplying trainable, but not trained, recruits" (Association of British Chambers of Commerce, 1984, cited by Noah and Eckstein, 1986). With regard to the curriculum, British employers are primarily concerned with basics as conventionally defined (Jamieson and Lightfoot, 1982; Noah and Eckstein, 1986).

In developing countries employers' opinions, like other aspects of labor markets, are less well documented, and such surveys as have been undertaken have often not asked directly for priorities, with the result that they tend to find that employers want more of everything. But the scattered evidence that does exist suggests that employers opinions concerning priorities are similar to those in developed countries.

In South Korea "the high school graduates' weak areas most commonly pointed out by employers are a lack of proficiency in foreign languages and inadequate writing capability in the national language...This deficiency in high school education causes many employers to hire college graduates." (Lee, 1983).

A survey in Honduras found that employers' opinions could be summarized as "give me someone who can read and write, who is motivated, who understands the meaning of work, and I can train him or her myself" (Kelly et. al., 1985).

In Panama, where the literacy rate is 90%, a survey of employers found nevertheless that the problem most frequently cited by them with regard to their workers was the poor basic education of the latter, which inhibited their ability to absorb new technical concepts and skills (Cuervo, 1985, pp. 3-30, 31). And their concern with comportment and motivation is such that they strongly prefer the graduates of a private technical institute to those of the public ones, despite the fact that the private institute uses 30 to 40 year old outdated equipment and recruits students of lower socioeconomic status, the explanation being that the institute directly and successfully addresses the employers' biggest problem--poor work ethic and attitude (Cuervo, 1985, 3-26, 27).

In Somalia "employers express a preference to hire unskilled workers and train them for the specific job for which they are hired" Somalia Ministry of National Planning (1984, p. 8-39). "Employers report that the needs of the private sector are for people with a broader technical background than a vocational education provides" (Chapman and Windham, 1985). (And yet vocational and technical enrollments are projected to rise to 70% of total enrolment in the current five year plan, despite the fact that the Ministry of National Planning report states that the quality of the training received by vocational students is so low that they do not have a comparative advantage over other secondary school graduates in gaining employment: Somalia Ministry of National Planning, 1982, 1984).

Such is the importance attached by some large U.S. employers to basic skills, and such is their frustration with the output of the schools and their pessimism concerning the difficulty of getting the school system to respond to their needs, that they are prepared to take direct action and incur substantial expenditure on remedial general education, offering courses in basic arithmetic, basic grammar, writing skills, etc, adopting a curative rather than preventive strategy (Center for Public Resources, 1982). Thirty five percent of the corporations in a recent survey were found to provide remedial secondary education for their employees, AT&T alone spending \$6 million a year for this purpose (Hemmings, 1982). A sample list of remedial courses offered by some employers is provided by Eurlich (1985).

To some extent the employers' perception of a need for courses of this type reflects a difference of opinion over what constitutes basic skills, and a general educator would not be expected to be enthusiastic about, say, the arithmetic course described in Council for Public Resources (1982) using tachistoscopes to increase computational speed and accuracy. But other divergences could be of more concern to educators, particularly those who feel a need to vocationalize education in some sense. Three independent surveys (Lusterman, 1977; Lynton, 1978, 1979; Center for Public Resources, 1982) found that employers attach greater importance than schools to the systematic development of interpersonal and communications skills. They are inclined to value more highly than schools skills which depend on primarily on practice, such as computational speed. And, even for students who are not entering technical occupations, employers see a greater need than schools for a knowledge of basic applied science or "technological literacy" (Lynton, 1979).

7.4 Technology in the secondary curriculum

Given the fear of policymakers that the expansion of academic secondary education will exacerbate the problem of the educated unemployed, and the emphatic rejection by employers of attempts to impart job-readiness, it is natural to suppose that some compromise between these two extremes might have decisive advantages over both. On this premise rests the search for a dilute form of vocational education which would enhance employability and serve as a complement to, rather than attempt to substitute for, on-the-job training.

Attempts have been made to implement three distinct approaches:

The craft, design and technology movement (CDT): The CDT approach, in the view of its advocates, brings the tradition of the school craft work-shop into the modern age, downplaying its role in developing job-readiness, increasing the emphasis on the artistic element (already very strong in some versions, as in the nineteenth century movement in Sweden) and introducing a cognitive intellectual dimension which previously had been lacking. In this metamorphosis a comprehensive mastery of manual skills has given way to the development of the ability to conceive of, and execute, a self-contained project.

Projects in applied science: This approach aims at attaining a similar objective from the opposite direction, the starting point being traditional science teaching which is modified by being given a practical bias and including projects involving applications in addition to regular classroom and laboratory teaching.

Principles of technology: The principles of technology approach is premised on the assumption that engineering is a discipline sufficiently distinct from science for it be possible to devise correspondingly distinctive school courses. It is therefore independent of both the traditional crafts and science components of the curriculum.

The following discussion draws heavily on the experience of the United Kingdom which provides an excellent illustration of the issues involved in implementing a technological syllabus in schools. The decentralization of responsibility for the curriculum allows almost unlimited scope for experimentation and advantage has been taken of this by advocates of each of the three approaches outlined above to make sustained efforts at implementation, often in competition.

A major problem with all three approaches, sufficient to rule them out immediately in many proposed contexts, is that the very fact that they are project-based makes them extremely expensive in terms of instructor and student time, not to mention materials. The occasions when attempts at implementation have had seemingly promising results have invariably involved dedicated, even fanatical, instructors, and almost equally motivated students, working together after school hours.

A second major problem with the CDT and the Principles of Technology approaches is that it has not proved possible to develop a coherent framework for a curriculum separate from the science curriculum. The advocates of these approaches in the United Kingdom, supported by the conclusions of the Finniston Commission on the engineering profession, attached great importance to the development of an autonomous curriculum, taking the view that "as long as engineering was regarded simply as the interface between science and industry, engineers would be regarded as second-rate scientists" (McCullough, Jenkins and Layton, 1985). However, the consequent commitment of substantial resources to the development of a distinctive curriculum has led to the conclusion that the terrain between the teaching of science and the development of manual skills is a quicksand: "...differences and a certain

lack of clarity persisted even among the advocates of autonomous technology. The Finniston Report conceded that mathematics and physics provided the "analytical foundation" of engineering, while others were unwilling to recognize this. Also, the combination of craft, design and technology often seemed an unwieldy and artificial alliance which still awaited a formula for a working coalition in curriculum terms" (McCullough, Jenkins and Layton, 1985).

Similar conclusions had been reached earlier by Dodd (1977): "Design and Technology has no recognizable body of knowledge or peculiar research method by which it may lay claim to discipline status...The wide spectrum of activities contained within the subject makes definition difficult. The interpretation of the word "design" has been a major stumbling block because it means so many different things to different people."

This does not mean to say that it is impossible to develop a technologically-oriented curriculum complete with senior secondary examinations. Outlines of some U.K. courses are given in appendices to U.K. Department of Education and Science (1982). But the very diversity of such efforts suggests that they represent an selection from an almost infinite range of possibilities which is inherently arbitrary.

Moreover, the fact that their character is acknowledged to be still experimental, despite a determined development effort which has been sustained over a long period, is powerful evidence that the search for criteria which could lead to the establishment of an autonomous discipline is hunt for a will o' the wisp. It is true that the effort has been fragmented, that it has encountered resistance at various times by political lobbies, purist science teachers and parents, and that individual initiatives have been sapped by infighting for control and funding, but it is also true that the effort has now harnessed perhaps hundreds of man-years of the most advanced expertise and there is no sign of an emergence of a core methodology which carries conviction. Current attempts to translate general objectives into a curriculum resting on well-defined principles, or even to define such principles, are meeting with as little success as those of 25 years ago.

As a result the science-based approach remains dominant in the U.K. and it is unlikely that its hegemony of the technology-in-schools movement will be seriously challenged in the foreseeable future, the current Vocational and Technical Education Initiative (described in Saunders, 1986) notwithstanding. The only real issue is how far it can differentiate itself from traditional science teaching, and McCullough, Jenkins and Layton are not optimistic, in view of the fact that advocates of applied science and technology are divided among themselves, have not formulated a coherent alternative syllabus, and have not worked out how one might be implemented in a crowded curriculum. And in any case, even in the most sympathetic environment, the scope for divergence is narrowly circumscribed by the expense of mounting projects: "It is not difficult to discern some of the obstacles to the implementation of a more practical and technologically-oriented curriculum in secondary schools. The problems of initiating, managing and assessing project work are a case in point. Although the benefits to students of project work have been widely extolled, adoption of this mode of learning is costly in terms of teacher effort and skills, to say nothing of time and

material resources, and it is not always easily compatible with traditional constraints on classroom life."

And there is always a danger that the practical element will be high-jacked, the projects being designed to further the teaching of science rather than to act as a bridge to industry. The Nuffield Foundation Science Teaching Project is cited by McCullough, Jenkins and Layton as a case in point, "The leaders of the project suggested that by encouraging scientific understanding and enquiry in pupils they would create a basis for technology and engineering...[they] argued that science and technology had identical interests. However [the Project] was a classic example of how pure science rather than technology tended to benefit from this relationship."

Science and technology in developing countries

The issues discussed above have seldom been seriously tackled outside the industrialized countries. In the typical developing country, the secondary schools may possess traditional craft shops and equally traditional science courses, with no attempt to establish any form of hybrid. Other issues are more pressing: the development of local textbooks and popular science books, the development of local supplies of equipment and materials, the replacement of rote learning by process skills, the training of teachers, and the inculcation in the general public of an appreciation of the role of science in everyday life.

In the Asia and Pacific region, in primary education up to 50% of the time in science courses may be prescribed for in-classroom practical activities (for example, in Malaysia, the Philippines, Korea, Singapore and Thailand), but their impact is frequently diminished by the employment of untrained or unqualified teachers and, despite the use of low-cost, local products, shortages of materials, kits and equipment. At the secondary level fewer modifications have been attempted and science education "is still academic, elitist and subject-oriented...the majority of students still receive secondary science as a traditional orientation for universities and other forms of higher education. The curricula are not, generally speaking, relevant to the world of work and to the learner's social and physical environment. Technology education is not given sufficient emphasis. These problems, which exist in the majority of the countries, are recognized by the authorities but so far have not yet been overcome. This is due in large measure to the problems of teacher retraining, as well as in some countries, to the undue influence of national examinations and of tertiary institutions. "The attitudes of parents and of the students themselves, who traditionally believe that an "academic" education is the "best" route for success in life, is another dominant factor in many countries" (Unesco, 1984b).

A few Asian countries go as far as providing multiple science syllabuses tailored to the requirements of different secondary streams. For example, science is a compulsory subject in Thailand for all streams, but the syllabus is different for the science and humanities streams in academic education and different again for each of the streams in vocational education. The problem with this approach is that the differentiation often turns out to be greater on paper than in practice: "When the content of these alternative

science courses and the real priorities for their learning (as indicated by examinations) are mapped, it is usual for them to be not very different in emphasis and kind from the academic science subjects. Fewer concepts and phenomena are covered than in the academic curricula, and the quantitative aspects are reduced, but the expected learning is still largely characterized by conceptual and factual recall. The fact that conceptual coverage does not need to be so extensive has not been used nearly enough to allow a broader study of topics to be undertaken so that the interface between their science content and other fields becomes apparent to these senior students" (Fensham, 1984).

7.5 The trade-off between school and in-service training

Although there are strong intuitive grounds for believing that there is scope for a trade-off between general education, instruction in technical theory and job-specific training, very few studies have attempted to address the issue empirically.

Of particular interest therefore is the comparison by Prais and Wagner (1983) of the apprenticeship training of electricians in the Federal Republic of Germany and the United Kingdom. Although they draw on population groups of comparable ability and age, the German apprentices were found by the end of their first year to have reached the standard of second-year UK apprentices, and at the end of the training the German examinations included questions closer to the UK technician than craftsman standard.

A major factor, in the view of the authors, is the markedly superior standard of mathematics training of the lower ability group in Germany, confirmed in a follow-up study: "the German system [of secondary education] had raised the average attainment [in mathematics] of its weakest 50 per cent of pupils to that of the average of all pupils in England...Attainments in mathematics by those in the lower half of the ability-range in England appear to lag by the equivalent of about two years' schooling behind the corresponding section of pupils in Germany." (Prais and Wagner, 1985).

Corroboration for these conclusions is provided by the summary of employers' opinions submitted by the Manpower Services Commission to the House of Commons Subcommittee on Education, Science and the Arts in 1983: "Lack of facility in mathematical skills means that many school leavers are unable to cope with craft training without remedial education and this gives widespread cause for concern." (cited by Noah and Eckstein, 1986).

The saving of a year of training in Germany (which permits training to a higher standard) appears to be costless since the resources devoted to mathematics teaching in Germany are similar to those in the U.K., the higher standard being attributable to the use of a narrower curriculum with more emphasis on applied topics, and a more motivating examination system (Prais and Wagner, 1985).

Another study, Maton (1969), has investigated the trade-off between the provision of school-based technical education and on-the-job training for a range of technician and craft occupations in Belgium and Argentina.

Regrettably its findings are almost certainly invalidated by selectivity bias.

7.6 Vocational guidance

There is a strong consensus with regard to the value of vocational guidance, preparation for work, and the cultivation of employability skills in helping students make appropriate decisions with regard to future employment and further training, make attitudinal adjustments which facilitate the transition from school to work, and find employment. Together the terms embrace: an understanding of the content of potential occupations and their entry level requirements that goes beyond titles to actual functions and tasks; a willingness to take instruction; the ability to work with others; the development of self-discipline and punctuality; a recognition of the tedium and discipline of entry-level jobs and a conditioning of expectations; and a knowledge of how to locate and apply for specific work opportunities.

The elaborate German arbeitslehre is held by some to be a model in terms of its effect on attitudes (though this is hard to separate from the effect of other influences) and the subsequent high (95%) completion rates of three-year apprenticeships. But that example raises two issues which can only be settled ad-hoc in any other context: the question of the desirable level of expenditure, and of the acceptable level of attitudinal conditioning. It is evident that the German practice, which may include workshop training, is expensive and that cost-effectiveness, narrowly defined, is much less of a consideration than its contribution to the development of a stable, committed workforce on employers' terms.

Guidance

The two main issues with regard to guidance are its cost and the extent to which it is expected to be responsible for attitudinal change, and both are illustrated by the arbeitslehre (work tuition), a particularly thorough form of guidance described by Prais and Wagner (1985), provided by secondary schools in the Federal Republic of Germany.

The programme differs between *lander* and between types of school and they describe the form taken in the Hauptschulen (lower ability schools) students in Berlin. Four periods are devoted to it each week from the age of 13 and eight periods per week at the ages of 15 and 16. Part of this time is spent on conventional guidance, which, in the penultimate year, typically includes work experience to assist the student choose his occupation. But most of it is devoted to promoting a knowledge of the workplace which may involve practical shopwork but also covers more general industrial and commercial matters as the organization of work. This element of the student's schooling becomes more specialized as he approaches 16 and hence may also to some extent be considered vocational in the sense of developing general technical skills or even job-related skills, but this is not its objective. The intention is to help the student choose a suitable apprenticeship, not anticipate the apprenticeship training itself.

While the cost-effectiveness of conventional guidance is almost self-evident, it is almost equally self-evident that there are diminishing returns to it as it becomes more elaborate, and particularly when it involves costly workshop experience. But there are no empirical evaluations and it is doubtful whether any attempt at one could carry conviction.

The second issue concerns the effects of guidance on attitudes and the differing views of educators and employers concerning the role of the school. In some countries employers feel that schools impart values which actually make the transition from school to work more difficult. For example in Britain, which has a long-standing and unenviable reputation for producing ill-educated and unmotivated school-leavers, "employers especially have complained that schools do not inculcate in school leavers positive attitudes toward business/industry, but instead even promote negative attitudes to authority, entrepreneurial activity, and the fundamental concept of a market-driven, profit-oriented economic system" (Noah and Eckstein, 1986, citing a 1984 memorandum of the Confederation of British Industries to the House of Lords Subcommittee on Education, Employment and Social Affairs.)

Unsurprisingly, when canvassed, employers invariably would like to see guidance go much further than the rectification of damage done. For example, in Britain, France and Germany, Noah and Eckstein found representative employers groups in favor of the positive reinforcement of business values as in the more developed examples of arbeitslehre, and moreover would be happy to see it extended to the teachers as well. But what may be acceptable in the German context, where "there is an extensive consensus about fundamental aims and means...in vocational education and training" and where "it would be difficult to explain the behavior and actions of employers, unions, Government(s) and individuals without this context" (Hayes, Anderson and Fonda, 1984), may encounter resistance elsewhere. Since there is no dividing line between guidance and indoctrination, it is clear that cost-effectiveness rapidly becomes subordinate to ideological considerations.

7.7 Conclusions

Although individual case studies frequently make a distinction between the different aspects of vocational education, evaluative surveys often have not. The quantitative evaluations reviewed are particularly deficient on this point and their limitations in other respects are so serious that one must view their findings with circumspection. The following conclusions must therefore be regarded as tentative.

Non-job-specific technical education versus job-readiness training

As a first approximation, the literature suggests that formal, school-based education can be a cost-effective way of providing general manpower development embracing not only academic education and the development of basic skills but also instruction in technical subjects.

As with vocational guidance, the real questions relating to this general type of vocational education are not whether but how much should be available (probably much less than is sometimes supposed, in view of the fact

that most occupations do not require extended training of any sort), at what level (secondary or postsecondary), and how it should be financed. But with regard to the issue of whether the vocationalization of education should go further and attempt to impart job-readiness, the consensus, as exemplified by the changing position of Unesco, appears increasingly to be negative.

As noted in Section 2, a generation ago Unesco endorsed the movement to provide occupation-specific training in schools (Unesco, 1961b), but its current position, as expressed in the Revised Recommendation on Vocational and Technical Education, is remarkably different. It advises only that member states should "consider" providing school-based vocational and technical education, and in its guidelines on curriculum there is no suggestion that job-readiness should be an objective.

In many countries, developed as well as developing, it is apparent that the view that school-based training should be restricted to the provision of technical instruction on a limited scale coincides with the public interest considered broadly. Almost everywhere there is a limit to the resources that can be made available to the school system and hard choices must be made between introducing new programmes and improving the quality of existing ones. It follows that a decision to vocationalize education cannot be taken in isolation. It necessarily involves the use of resources which could otherwise be applied to some other objective.

This point needs to be stressed because vocational education is much more expensive than basic education and even in some of the most developed countries the quality of the basic education leaves much to be desired. In the United States, for example, it is estimated that 20% of high-school leavers are functionally illiterate. The Office of Education estimates that 40%-50% of urban students have serious reading difficulties. In 1981 half the teachers newly assigned to high school mathematics and science classes lacked appropriate subject matter credentials (Center for Public Resources, 1982).

Other arguments for mass vocational education

The relevance-for-work argument

It is frequently argued by advocates of vocational education that a failure to provide school leavers with employable skills is responsible for growing youth unemployment. However, since most occupations need very little training, pre-employment or otherwise, a switch to vocational education can have little impact on unemployment. The only solution is to acknowledge and respond to the problem of an excessively rapid growth of the labor force. If the existing provision of academic education appears to be excessive, it would be more prudent to cut it back, and use the resources released to improve the coverage and quality of primary education, than to switch to a more expensive but no more effective curriculum.

The transferability of skills argument

Mass vocational education is frequently advocated on the ground that the value of training lies only partly in the acquisition of skills for a

specific occupation. Partly it lies in other effects on the individual, both cognitive and affective, which can be transferred to other occupations: an understanding of general principles and an ability to make use of a rigorous technical framework, self-discipline and a pride in workmanship, etc.

Castro (1979) goes so far as to argue that the fact that SENAI graduates have a greater tendency to change occupations than those trained on the job after academic education is a positive, rather than a negative aspect of the training, for its particular clientele: "The occupational changes made by SENAI graduates, which cause certain people so much concern, are in fact an indication of flexibility and adaptability, not of ineffectiveness of the programme in the face of the frictions and conflicts of the labor market. We can do no more than speculate as to the reasons for this greater adaptability, compared with workers who have only an academic--and, supposedly "general"--training. Industrial workers tend to come from the lower classes, and Brazilian schools still have a strong middle-class bias; they impose overambitious curricula lacking practical focus and employing modes of expression not mastered by working-class children. Occupational flexibility ultimately rests on the understanding of general principles. Ideally a sound academic education would give its students the best possible grasp of general principles. But in Brazil, as elsewhere, these principles are often taught in a vague and perfunctory manner and are incomprehensible to lower-class children. By contrast, the SENAI-type courses offer, as an alternative, a minutely detailed sequence of operations. The scientific and symbolic language barrier is broken down by the use of methods in which language plays a minor role, being used mainly for factual and concrete descriptions of processes that are simultaneously taking place in front of the student. By handling tools and materials the students come little by little to absorb the general principles intuitively. They may acquire a very poor substitute for twentieth century science and technology, but they acquire a knowledge that is far more useful and adaptable than the half-thoughts learned by rote in an academic school."

A further example provided by the same writer suggests a response: Castro (1986) notes that many of those who reached important positions in public or private administration in times gone by in Brazil had undergone training in a Jesuit seminary, and that nowadays the same role is played by schools of engineering. He suggests that a rigorous training, whether in the Summa Teologica or principles of engineering, is the common factor. The answer to this, if true, is to retain the seminaries--or find a general education substitute--given the cost of technical training in general, and engineering in particular.

The "cooling out effect"

The second argument in favor of widespread vocational education is that it has a "cooling out" effect on the demand for formal education. There is now substantial evidence that the curriculum exerts a negligible affect on aspirations by comparison with social and family values and information about career prospects.

8. SPECIALIZED SOURCES OF SKILL DEVELOPMENT

8.1 The role of specialized sources

Specialized sources of skill development mostly fall into two broad categories. First, there are those which are primarily enterprise-linked and are complementary with other forms of enterprise-based training. Examples are training provided by other enterprises through various types of commercial links (participants in joint ventures, suppliers of materials or capital goods, even customers), training of a similar nature promoted by donor or technical assistance agencies, and training provided by expatriates. Second, there is the training offered by proprietary schools which is a substitute for public provision. Fitting into neither category particularly well is the training in civilian skills provided by the military in some countries.

These sources of skill development seldom receive much, if any, attention in national planning or policy documents. One reason is that staff of central government agencies are often unaware of the range and volume of these sources, their familiarity with, and enthusiasm for, one specialized source, donor-agency-sponsored overseas training schemes for government staff, contrasting oddly with their lack of knowledge elsewhere. The asymmetry reflects their direct experience with this source and the fact that the other types tend to be overlooked in statistical surveys. A second reason is that much specialized training is provided both for and by the private sector and as such is considered almost unworthy of official attention. A third reason is that much of it is provided on a very small scale.

None of these reasons justifies the neglect of specialized training. The fact that it generally takes place without government intervention is itself prima facie evidence (which, of course might be controverted by detailed analysis) that it is cost-effective. Like orthodox enterprise-based training, it may actually be a substitute for the public provision of training. And although it may be provided on a small scale, it is often a key input into the production process, especially when technology is changing. Not least, a knowledge of the contribution of these types of training is essential to the development of an understanding of the interplay between training and employment.

8.2 Long-term training links with other enterprises

In industrialized as well as developing countries much training is provided by one enterprise for another with which it has commercial links. In developing countries this type of transfer of skills, like the transfer of technology with which it is usually associated, assumes particular importance when the link involves an overseas firm. In the absence of specialized technical institutes, of competitor firms using the same technology, and of trade journals, it may be the only practical source of new skills.

The most conspicuous training efforts involve enterprises linked by equity to overseas firms, either as wholly-owned subsidiaries of multinationals or as partners in joint ventures. The overseas firm may periodically send instructors to set up temporary or permanent local courses, or it may second nationals to plants abroad, according to the dictates of economies of scale. Often the main motivation is the high cost of expatriates compared with that of similarly qualified nationals. A second reason, often reinforced by legislation or by undertakings given to the appropriate ministry at the time of establishment, is a desire to maintain good relations by employing nationals.

Similar types of training may be provided under franchise arrangements, but as in the case of the transfer of technology, the transfer of expertise may be incomplete, and for the same reason: it is in the interest of the franchiser to withhold effective access to the kernel of the technology, and hence the highest levels of expertise, especially in the case of overseas operations where legal agreements may be costly to enforce or unenforceable.

8.3 Start-up training

The most dramatic form of short-term enterprise-linked training is the start-up training required for the commissioning of a new industrial plant which is so large that its manpower requirements cannot be satisfied by the existing labor force or existing sources of training provision. Whether it be establishing a plant of its own, or acting as a partner in a joint venture, or as a contractor, a multinational can be expected to assume responsibility for training the workforce as an integral part of the package of technological transfer. Indeed the credibility of partners or contractors depends on the possession of a training division capable of mounting the necessary programme.

Start-up of a pharmaceutical dosage plant

The following example, described by Behrman and Wallender (1976) and cited by ILO (1982), is representative. The Nigerian Government decided to build a pharmaceutical dosage plant, planning beginning in 1970 with completion anticipated in 1975. The five-year construction period gave the contracting multinational ample time to train the workforce largely from scratch, using its own instructors on site and sending some key trainees overseas: "The first manpower training objective was to recruit and train the national plant engineer, quality control manager, production manager, PPIC (production planning, inventory and control manager) and packaging manager. Extensive training was provided for these staff in Europe and the United States as well as in the African management center in Nairobi. They, in turn, trained the production, maintenance and workshop foremen. Technicians and workers were hired after the completion of the first year of training for the first-line management... Since process and quality control skills of the kind needed are not available locally, the local plant spent up to 70 man-days exposing and training workers, laboratory technicians and other personnel to the manufacturing and control system. As a rule, workers have only rudimentary education and at best some exposure to compounding skills used in

food processing or basic chemical production. For many, training starts with how to use rulers and simple scientific tools and then goes on to the actual maintenance and operation of the blenders, encapsulators, slugging machines and so forth. Laboratory workers receive even more extensive training in the use of equipment and techniques for laboratory procedures. Throughout the training emphasis is placed on attitudes for quality control, which in a pharmaceutical plant is known to be even more essential than task skills." (ILO, 1982).

Start-up of a fertilizer plant

A second and more recent example, involving some innovative features, is provided by the current start-up of a major fertilizer plant, also in Nigeria, outlined in Kellogg (1987). The National Fertilizer Company of Nigeria (NAFCON) was established under a contract between the Nigerian Government and Kellogg with the former holding 70% of the equity and the latter 30%, with Kellogg responsible for both construction and training. The Kellogg holding will be bought back by the Government provided that Kellogg meets certain clearly-specified production and training targets on schedule over a period of four years from the commissioning of the plant.

In 1985 a training needs assessment was undertaken and in the following two years, while the plant was being constructed, the Nigerian labor force was recruited and part-trained in a specialized on-site facility which will later be largely converted to other uses. The dominant feature of the selection process was the application of a battery of aptitude tests to assure the trainability of the personnel.

A period of one year after the commissioning of the plant has been allowed for test runs and on-the-job training, after which the workforce is expected to be 80% localized. The plant is then due to enter commercial operation and 95% localization of the labor force is expected to be achieved over the next five years, with a gradual phasing out of the expatriates working with understudies in engineering, supervisory and management posts.

Start-up intermediaries

The examples described above both relate to the establishment of large industrial plants with training provided by a dedicated department of the contractor as an ancillary service. When it comes to the establishment of smaller undertakings, especially those whose physical investment is mostly in the form of buildings rather than specialized plant, these services are often lacking. One measure sometimes adopted by national or regional authorities to attract such enterprises is to train ahead. This involves determining a priori the type of enterprise to be attracted, anticipating their manpower needs, and satisfying them ahead of time through institution-based training. Needless to say, such a strategy inevitably is wasteful. Even with the most careful planning, the match between skill development and utilization is poor, some trained workers disappear to other areas if not promptly recruited, others find their skills atrophying for lack of use.

An alternative measure is to establish an agency which can organize start-up training for a prospective investor, taking over in a catalytical manner the role played by the training services division of a multinational. It assesses the training needs of the investor and helps it to identify, and contract with, existing training institutions to meet these needs during the construction phase of the investment. By making it possible for the training to be done in real time after needs have been assessed, the guessing and waste associated with the train-ahead strategy are avoided.

Many developing countries have established agencies to facilitate direct foreign investment, but often their contribution is limited to the provision of information concerning the existing labor supply and relevant legislation. The best examples of actively-involved start-up agencies are those to be found in some of the southern and midwestern states of the United States: Arizona and Kentucky (Langen and Thomas, 1979); Mississippi (Brooks, 1976); Alabama, the Carolinas and Virginia (van Cleve, 1976); and Oklahoma and Texas (Russell, 1980). These operations have typically originated at the grass-roots level with post-secondary institutions broadening their market by adding a flexible, quick-response training mode to their normal academic programmes. It has then been a normal progression for them to join forces with state agencies responsible for administering regular vocational education or job-training programmes.

8.4 Desultory training links with other enterprises

Supplier training

The piecemeal introduction of equipment and systems embodying new technology into existing enterprises is less dramatic than the wholesale technological transfer associated with new projects but it too gives rise to a need for skill development which can be satisfied in a similar way. In developed as well as developing countries, suppliers of the equipment are utilized as a source of the associated training, as a recent U.S. survey of small businesses indicates: "Equipment suppliers are important alternative providers of training. Most vendors of industrial equipment either operate factory training schools, send trainers out with the equipment or provide canned print and audiovisual training materials, depending upon the difficulty of the skills involved. Employers rarely find it necessary to train the operators of new equipment though they are generally responsible for training the replacements of the original cadre...Two mining machinery manufacturers and a power shovel manufacturer maintained training staffs which travelled all over the world with their machines to train the new operators. Manufacturers of specialized computer equipment did the same but on a national level only. Many firms reported relying heavily on vendor training." (Mangum and Mangum, 1984).

Similar findings are reported by a U.S. study of manufacturing firms using programmable automation (United States, Office of Technology Assessment, 1983). Only 22% of the firms undertook or sponsored employee training. They left this task to the suppliers of the equipment, 93% of which provided

training, and moreover they were content with the arrangement, not being in favor of the establishment of publicly-supported training schemes.

An example of supplier training in a developing country is provided by Marsden (1984) who describes training provided by a Thai importer of industrial equipment and office machinery to its customers. The firm maintains a staff of over 100 engineers and mechanics, partly to provide supplier training, and partly to undertake repairs and preventive maintenance. This staff has itself in turn been trained by the overseas companies whose products it imports.

Supplier training is certainly found universally in developing countries but, like most non-mainstream types of training, is less well-documented than in the industrialized countries and as a consequence its impact tends to be underestimated or even unnoticed by the central planning authorities.

Customer training

Less important than supplier training but nevertheless not uncommon is the training and guidance provided by the customers of firms, particularly where the commercial arrangement is relatively stable, as in a subcontracting arrangement. A typical example is the training provided by a Japanese-Thai joint venture for its subcontractors described by Marsden (1984). The joint venture makes 100,000 diesel engines a year, but its own operation is limited to grinding the main bearing case, finishing the crank case, and assembling the several hundred engine parts. Under Thai regulations at least 60% of these parts had to be locally sourced by the end of the third year of operation. To comply with this regulation, the joint venture embarked on an active policy of selecting suitable subcontractors and developing their capacity to produce the parts in the required quantity and quality.

8.5 Expatriate training

In some developing countries a shortage of experienced senior managers and specialized technicians makes it impossible to fill all such positions in new plants with local personnel. The standard solution is to recruit expatriates on a temporary basis with the double function of performing, or co-performing the job, and of training a local successor within a period prescribed by government regulations intended to ensure a rapid transfer of skills. In some countries which have recently gained independence, expatriates fulfill a similar function in existing enterprises.

Regardless of the context, success of the arrangement depends upon allowing sufficient time for the transfer of skills, and this is often severely underestimated by government departments responsible for monitoring localization. In the case of supervisory and senior posts, the transfer is necessarily a slow one, the role of the expatriate being to develop the managerial skills of his understudy through a coaching process which cannot be compressed without impairment. In the industrialized countries it is reckoned that it takes 20 years of experience to produce a competent plant manager or

maintenance manager and it is wholly unrealistic to suppose that it takes less elsewhere.

Nevertheless in some countries, notably in sub-Saharan Africa, there persists a belief that it is possible to localize even the most senior posts within a few years of the recruitment of an appropriately-trained university graduate as an understudy, a belief which places an excessive weight on formal education and which undervalues the contribution of experience to the successful development of management skills. In some cases the premature localization of parastatal management has had such an adverse effect on performance that the management has had to be delocalized, expatriate contracting firms being brought in to reverse the decline.

The successful use of expatriates depends not only on the careful selection of the trainee but also of the expatriate, who should be capable of training himself out of a job and motivated to do it. Expatriates recruited through multinationals or international agencies may be relatively costly compared with those recruited individually, but the fact that they belong to large organizations which can offer them alternative employment at the completion of their assignment makes them less difficult to dislodge.

8.6 Military training in civilian skills

In many countries training received during military service is a significant type of skill development for the civilian labor force and it is unaccountably overlooked by planning authorities. In the U.S., for example, vast sums are spent by the armed forces on training which is not specific to military applications. While much of this expenditure is on basic education and remedial in nature, the military is also an important source of training for some occupations: at the time of a 1963 survey, it had provided the following proportions of formal training: health technicians, 44%; electrical, engineering and related technicians, 25%; bakers, 64%; telephone and power linemen and related workers, 28%; airplane mechanics, 61%; auto mechanics, 22%; radio and television repairmen, 25% (U.S. Department of Labor, 1964, Table 4).

8.7 Proprietary schools

Proprietary schools play a significant role in skill development in some countries but their contribution, actual and potential, tends to be discounted. When statistical authorities are aware of the scope of their activities, which is seldom the case, it is frequently assumed that their role is too marginal to justify the commitment of the resources necessary to maintain useful records on their highly-diversified activities. Distaste for their profit motive, an unfounded assumption that their programmes are confined to minor types of skill development, and suspicions about the quality of the instruction provided reinforce official neglect.

Nevertheless they are big business in some developed countries. In the U.S., for example, they enroll 3,000,000 students each year, three times

as many as publicly-supported post-secondary training institutions, and they gross \$2.5 billion annual revenues (Wilms, 1975).

Documentation of their activities in developing countries is almost non-existent but one study reveals that their contribution can be much greater than most planners give credit. Lukomski (1978) traced the training origins of a sample of 540 lathe-operators, perhaps the archetypal industrial occupation, in Sao Paulo in Brazil. Before the study was undertaken it was supposed that about 60% would have served conventional three-year apprenticeships with SENAI. In fact the figure was 30%. Most of the remainder had trained by taking non-apprenticeship courses, and "what was most surprising was the high percentage of courses taken in proprietary industrial schools--about 55%. Although it was known before the study that the proprietary schools existed, it was not realized that they were responsible for 1.7 times as many courses as SENAI...The existence of a 'system' of proprietary industrial training--relatively large and with a long history--was one of the most important findings of the study."

8.8 Correspondence courses

Correspondence courses are the dominant form of proprietary training in the U.S., enrolling two million students and generating over \$1 billion annual revenues (Wilms, 1975). They account for 25% of the formal training received by accountants, 27% of that received by engineers, and 30% of that received by radio and television repairmen (U.S. Department of Labor, 1964, Table 4). And yet very little is known about their costs or benefits--how many students complete their courses, what recognition, if any, is given to their credentials by employers, etc. Moreover, if the Proceedings of the National Invitational Forum on Correspondence Education held in Columbus, Ohio in 1984 (Cambell-Thrane, 1984) are indicative, there is no prospect of systematic evaluation being undertaken in the immediate future.

In other countries there may even be no systematic information on the identities of the enterprises, never mind the scale of their operations, especially where their activities cross international frontiers. The occasional ad-hoc training survey may shed a little illumination. In Zambia, for example, the 1983 Manpower Survey (Zambia National Commission for Development Planning, 1985) revealed that "out of total Zambian employees, 23.5 percent reported to be receiving some kind of education or training at the time of the survey. Of these, 43.2 percent were training through correspondence, 24.2 percent formal on-the-job training, 15.1 percent evening classes and 10.2 percent in-service training". There is no information on the content of the courses and it is evident that white-collar skills predominated, but a table shows that 30% of them were being taken by production and related workers.

All too often, however, the survey instrument in such an inquiry preempts the gathering of information on correspondence courses by consigning them to the catchall category of "other types of training".

The literature does include a few isolated accounts of attempts to use correspondence courses for vocational and technical training. A small-scale auto-mechanics pilot study undertaken in Indiana in 1974 illustrates some of the issues. Unsurprisingly, most vocational education administrators involved with the project felt that a lack of "hands-on" tuition limited the scope of this mode for skill development, and a lack of access to equipment was also cited as a matter of concern. Accordingly they felt that the mode was best suited to imparting education related to occupational training, and in particular, vocationally-related mathematics, blueprint reading and some science subjects like electricity, electronics and refrigeration.

In view of this, an obvious possible application of the mode is to supply the training-related education component of an apprenticeship course in places where the geographical dispersion of the population makes conventional institution-based education uneconomic. Nanayakkara (1981) reports that this approach has been adopted for 24 of the trade apprenticeships regulated by the National Apprenticeship Board in Sri Lanka, but no evaluation appears to be available. An earlier very small-scale U.S. experiment, the Isolated Apprenticeship Program in New Mexico (New Mexico State Department of Education, 1972) failed after rapid director turnover. The British Open Tech experiment, a government initiative intended to foster the creation, without a central organization, of occupational training courses serviced by units in polytechnics and similar institutions (Tinsley, 1985), is still in its infancy but may eventually provide material for evaluation.

8.9 Training brokers

It is beyond the information-processing capacity of many enterprises to evaluate the extraordinarily heterogeneous sources of external training available nationally and internationally. As a consequence an efficient exploitation of training resources depends on the mediation of an agency equipped to play the role of a training broker, that is, to advise enterprises in the light of their needs, drawing on a comprehensive knowledge of relevant training provision. There is no systematic literature on training brokers and the examples given below are merely illustrative of the contribution that they can make to cost-effective training.

International training brokers

The highest profile type of international training broking is undertaken by donor agencies assisting in the choice of appropriate destinations for individuals selected for aid-assisted training, either under the umbrella of a technical assistance programme or as a component of project-related training.

Closer to true mediation is the broking service provided by the ILO International Center for Advanced Technical and Vocational Training, an example being the organization in 1985 and 1986 of two training study tours in coal-mining safety in the Federal Republic of Germany, Italy and the United Kingdom for Indian coal mine staff.

National training brokers

Public training brokers are much more common than private ones and, like their international counterparts, they may also be responsible for financing or subsidizing the training. Some, for example the Manpower Services Commission in the United Kingdom, may assign trainees to external training providers, but in many countries the national agency is also a dominant provider of nonformal institutional training and the broking function is an internal part of its own operations. An innovative example of a government initiative addressed to external users is the Minitel computerized training information service provided by the Secretariat d'Etat d'Information Professionnelle in France.

Even more innovative is the service provided, also in France, by Ecoform. This undertaking acts as a true broker, advertising its services to small and medium enterprises, assessing the training needs of those which respond, and then putting together appropriate training packages drawing on existing sources of training provision. No formal evaluation is available but its immense profitability suggests that it is making a useful contribution to the efficient allocation of training resources.

9. OPTIMIZING THE MIX

9.1 The importance of initial conditions

The cost-effectiveness of any new training initiative depends critically on the existing state of training resources and for this reason, if for no other, there can be no universal recipe for training provision. There is no guarantee that a system ideally adapted to the conditions and needs of one country would even be workable in another.

There are two further reasons for caution in the re-design of training systems. One is that even when well-conceived and well-implemented, there is usually a long maturation period before the operations of a training system approach maximum efficiency. It may take a generation for policy-makers to determine the optimal degree of decentralization, for training institutions to develop their full range of services, and for employers to learn the importance of cooperation and forge effective links.

It follows that proposals for radical change need to be treated with special care, for the greatest cost may not be the investment in buildings and equipment, but the damage to these intangibles. The history of developed and developing countries alike bears witness to the strength of the temptation to call for reform, reinforced in recent years by the hope that training can somehow alleviate the unemployment or underemployment caused by macroeconomic factors. But in training, even more than in other fields, it may be much more cost-effective to make existing institutions work better than to replace them.

The other reason for caution is the convergence of training modes noted in the introduction to this chapter. In many countries with well-articulated training systems, training increasingly integrates theoretical instruction and practical work experience, sometimes in a modular form, with the result that the differences between school-based training, center-based training and apprenticeship schemes have appreciably diminished, to the point where the content to a particular programme may depend more on occupational specifics than on the type of institution responsible for it. As part of the same process, individual training institutions are broadening the scope of their activities: it is now common to find under a single roof offerings ranging from short employer-specific training courses, with ad hoc contracts, to formal academic programmes, the funding coming from an equally heterogeneous variety of sources.

As a consequence, unless it is seriously deficient, the initial design of a training system is less crucial than once was thought. It is at least as important to ensure that the system possesses an ability to evolve in the light of its own and vicarious experience and that it makes use of this ability.

The following conclusions regarding school-based training, center-based training and employer-based training should therefore be interpreted as bearing on desirable directions for change, in very general terms.

9.2 The role of the national training authority

Besides retaining control of finance and evaluation and central services like instructor training and trades testing, the national training authority is responsible for taking strategic decisions for the sector and for making interventions which improve the quality of decentralized decisionmaking.

The strategic decisions involve such matters as: the introduction or significant expansion of training modes and the establishment of agencies for supporting them, regulating them, and providing incentives (industrial training boards, trades testing boards, etc., regulations requiring enterprises to employ a certain number of apprentices, levy/grant schemes, tax deduction schemes, etc.). Although in principle a central function, its efficient execution normally requires grassroots consultation, as the failure of so many centrally-imposed initiatives bears witness (the collapse of the 1971 Brazilian vocational education reform of 1971, attributed in part by Piletti (1984) to a failure to consult and involve the schools, being a classic example).

The national training authority can also contribute to the quality of decentralized decisionmaking by improving the links between training providers and employers, by upgrading the record-keeping of training providers and major public sector employers, and by requiring major training providers to monitor and justify their unit costs, etc. And if it is able to influence the agency responsible for setting public sector pay scales, it may be able to ameliorate the distortionary effect of inappropriate wage differentials on training incentives.

For example, in both Egypt and China the differentials between the official wages of skilled and unskilled workers are small. In Egypt enterprises, despite belonging to the public sector, are allowed to offer "incentive" payments according to need, with the result that the labor market reflects skills shortages and provides incentives for individuals to undertake apprenticeships (ILO/Government of the Arab Republic of Egypt, 1984); by contrast Chinese enterprises are not allowed such flexibility with the result that there are chronic shortages of skilled labor and such skilled labor as does exist tends to be misallocated (Noah and Middleton, 1988).

The conditions for successful devolution of decisionmaking are succinctly summarized in World Bank (1986): it depends on "the ability to: (a) define clearly what elements of the system are being devolved; (b) retain centrally some critical elements, such as examinations, testing, instructor training, and policymaking; and (c) define areas in which local headmasters or directors are free to innovate, for example, in developing links with industry, introduction of new programs, determination of class size, student recruitment and placement."

The extent to which devolution is feasible and desirable depends critically on the entrepreneurial as well as managerial ability of the directors of training institutions and on their commitment to accountability. It also depends upon the support that can be expected from local employers and

community leaders. These factors are of course not independent of the degree of devolution itself, and for this reason the implementation of devolution is more likely to be successful if it is approached as a gradual process rather than an instant policy change.

It is no accident that some of the most successful examples of decentralization are to be found in the U.S., with its long commitment to the devolution of authority for education and training to the community. Its responsibility for funding most of its expenditure on education and training through property taxes has both encouraged the development of local managerial expertise and has provided it with the necessary operational resources, with the result that one can even cite instances of thriving decentralized systems based on formal education establishments, for example, the Oregon training system based on community colleges.

However one can also point to promising examples of decentralization in developing countries. For example, the Middle East survey reports significant movements in this direction in Jordan, Egypt and Morocco.

9.3 The need for information

The need for an appreciation of comparative experience

Although the importance of a knowledge of relevant international comparative experience for policy formulation is obvious, it has been ignored in the past and is still not always given due respect. There continues to be ample evidence of policymakers in some countries subscribing to imperatives based on little more than their intuition. And since policymakers in national planning units often have little direct, detailed knowledge of training and employment, their intuition is often poorly developed.

The two most prevalent biases are an overestimation of the proportion of the labor force that requires significant occupational training and over-reliance on institution-based training, particularly school-based training.

The unreceptiveness of policymakers to the notion that employers can make a major contribution to skill development is exemplified by the Conference of African States on the Development of Education in Africa hosted by Unesco in Addis Ababa in 1961. Ignoring a background paper by an acknowledged expert which drew attention to the fact that "many categories of skills are best developed on the job and/or through apprenticeship arrangements. In most countries, all semi-skilled labor and most highly-skilled craftsmen and lower level supervisors can be trained on the job" (Harbison, 1961), the Outline of a Plan for African Educational Development produced by the conference, which in most other respects faithfully incorporated Harbison's recommendations, asserted a supposed need for a greater emphasis on school-based training: "...at the second level, increased emphasis should be placed on technical education and on agricultural education. Trained manpower in these two areas is essential to the economic development of African States." (Unesco, 1961b, p. 11). The effect was to

reinforce the notion that the vocationalization of education is necessary for skill development, rather than one of a number of options (Psacharopoulos, 1987).

That was a long time ago and since then there has been extensive documentation of the role of enterprise-based training, particularly in West and North Africa. Nevertheless, progress towards the opening of minds has been erratic. In 1977 the Nigerian National Policy on Education stated, that "students who leave school at the junior high school stage may then go on to an apprenticeship system or some other scheme for out-of-school training" (Urevbu, 1984), but in the same year the Zambian Educational Reform document, 100 pages long, mentions apprenticeship just once, and then to assert that it "is not considered suitable for a variety of valid reasons" with no further elaboration (Zambia Ministry of Education, 1977, p. 49).

Perhaps the best known current example of persistence of the bias is the movement to vocationalize higher secondary education in India. The 1964-66 Kothari Commission proposed a target of 50% vocationalization, described as "arbitrary" by Shah, Prakasha and Nischol (1986). The most recent initiative (National Policy on Education - 1986) has a more modest target than its predecessor, the aim now being to secure 25% coverage by 1995, but it does not make any greater attempt to provide a rationale. Shah, Prakasha and Nischol note that the 1985 report of the National Working Group concedes that vocational education is "still an experiment" and criticize it for failing to consider whether the same employment objectives might not be better achieved by making greater use of the 5,000 existing vocational and technical institutions in the country. They conclude that "it is not a small regret that education continues to behave like an industry which has no use for its own experience. It is not clear whether the continuing interest in vocationalization in certain quarters, is due to the initiatives of the Central Government and the temptation of the funds that go with the scheme, or to any real potential of the idea to respond to the problem of educated unemployment."

The need for an occupational training map

If an understanding of pertinent comparative experience is one precondition for rational policymaking, a knowledge of existing training provision and its impact is another. Ideally the policymaker should be in the possession of an occupational training map (Dougherty, 1987a) which traces the pathways taken by individuals through different types of training provision, structured or casual, to different occupations.

From one direction it would show how the graduates of a particular type of training end up in appropriate or unrelated occupations, as in tracer studies. From the opposite direction it would show how individuals reach an occupation by different routes (reverse trace studies). Ideally one would like to have information on the numbers of individuals traversing each of the more important routes, and to supplement this with qualitative evaluations, from both trainees and employers, of its advantages and shortcomings.

This kind of information sheds light on the alternatives available to the policymaker. The naive theorist tends to assume that there is a one-to-one correspondence between occupation and appropriate training for skilled manpower. This was often explicit in early tracts on manpower planning, and even in some current ones. In general, nothing could be further from the truth. As Ahmed (1975, p. 28) observes, "it has always been possible to develop most of the middle-level skills, except for the highly specialized skills requiring advanced technical or professional training, by the enterprise itself through various improvised means. We see, therefore, that carpenters, electricians, masons, plumbers, tractor drivers, and crane operators help to build and maintain modern hotels, highways, airports, and radio stations; they operate trucks, railway locomotives, power stations, and irrigation projects in Kabul, Ouagadougou, and Gangtok. Most of these skilled workers have not come from formal vocational institutions".

The same observation applies equally well to the industrialized countries, even in occupations regarded as highly skilled. The classic study of the training of tool-makers and die-makers in the United States, Horowitz and Hernstadt (1969), found that roughly equal proportions had acquired their skills through apprenticeship, school-based training, and casual methods, and that there were no important differences in the competency of workers produced by the different paths. The most common route involved first reaching the status of all-round machinist and then conversion. Irrespective of the training path, practical work experience was almost unanimously regarded as the most useful part of the training.

The need for information on costs

The unit costs of different types of education and training are very seldom estimated and updated systematically in developing countries, despite the need for such data for determining priorities.

9.4 The issue of pre-employment versus in-service training

In Section 7.1 it was observed that there is a tremendous tendency for planners and policymakers in developing countries to overestimate the absorptive capacity of the labor force for new entrants with occupation-specific pre-employment training. The reason is that in most countries most entry-level jobs need very little initial occupation-specific training, as opposed to general education.

The case for pre-employment training is weakened still further by the fact that, again contrary to the belief of many policymakers, it is hardly ever essential even for those occupations which do require substantial skill development; as has been seen in Section 5, in most countries most occupations, up to and including highly-skilled craftsmen and lower-level supervisors, can be trained on the job. This changes the issue from whether pre-employment training is needed to whether it is desirable from the point of view of cost-effectiveness or other criteria.

Overwhelmingly the answer is that in developing countries, as in the more industrialized ones, cost-effectiveness requires that it should be kept to a minimum for subprofessional occupations, and perhaps some professional ones as well, provided that upgrading facilities are available. The proviso is, of course, non-trivial in its implications. In-service training arrangements make substantial demands on managerial skills which are often in short supply. It may be argued that since traditional institutional pre-employment training is one-shot, it makes fewer demands in this respect. But this is an illusion. Experience suggests very strongly that institutional pre-employment training is successful only when it enjoys very good management.

In the more industrialized countries the structural change in the demand for labor is reinforcing the case against the train-first work-later model of occupational preparation. The growing pace of change of the content of occupations, particularly technical ones, the widening variety of skills demanded, and the shift from manual to knowledge-based skills, mean that pre-employment preparation should have trainability, not job-readiness, as its goal and that an individual can expect to have his job-specific training distributed over his lifetime. In developing countries these pressures are less acute, outside enclaves of high technology, but restructuring in response to changes in the both external and internal demand often has the same implications.

9.5 The role of the school

As a first approximation, the literature suggests that, for the purposes of manpower development, cost-effectiveness requires that the role of the school should be mostly confined to the development of basic skills, vocational guidance and instruction in technical skills which does not attempt to achieve job-readiness. With regard to the latter, the real questions are not whether but how much should be available (probably much less than is sometimes supposed, in view of the fact that most occupations do not require extended training of any sort), at what level (secondary or postsecondary), and how it should be financed. But with regard to the issue of whether the vocationalization of education should go further and attempt to impart job-readiness, the consensus, as exemplified by the changing position of Unesco, appears increasingly to be negative.

As noted in Section 2, a generation ago Unesco endorsed the movement to provide occupation-specific training in schools (Unesco, 1961b), but its current position, as expressed in the Revised Recommendation on Vocational and Technical Education, is remarkably different. It advises only that member states should "consider" providing school-based vocational and technical education, and in its guidelines on curriculum there is no suggestion that job-readiness should be an objective.

In many countries, developed as well as developing, it is apparent that the view that school-based training should be restricted to the provision of technical instruction on a limited scale coincides with the public interest considered broadly. Almost everywhere there is a limit to the resources that

can be made available to the school system and hard choices must be made between introducing new programmes and improving the quality of existing ones. It follows that a decision to vocationalize education cannot be taken in isolation. It necessarily involves the use of resources which could otherwise be applied to some other objective.

This point needs to be stressed because vocational education is much more expensive than basic education and even in some of the most developed countries the quality of the basic education leaves much to be desired. In the United States, for example, it is estimated that 20% of high-school leavers are functionally illiterate. The Office of Education estimates that 40%-50% of urban students have serious reading difficulties. In 1981 half the teachers newly assigned to high school mathematics and science classes lacked appropriate subject matter credentials (Center for Public Resources, 1982).

9.6 Employer-and-center-based training

If it is accepted that the role of the school is confined to general manpower development, there remains the question of how to organize job-specific training. It has been seen that most skills can in principle be acquired entirely on the job--and this is also the dominant practice in most developing countries and in Japan. Alternatively, they can be acquired through full-time attendance at an out-of-school training center, followed by a shorter period of job-readiness training on the job. But there is overwhelming evidence that the optimal choice for many occupations is neither of these extremes, but some parallel combination of the two.

For many occupations, particularly the less skilled ones, on-the-job training is adequate. Large firms may also be capable of (and enthusiastic about) developing higher level job-skills without recourse to external centers. But the Japanese practice of using on-the-job training even for high level skills is not an attractive option in most developing countries. In the first place it requires a commitment on the part of the employer which is assured in the larger firms in Japan by the life-long employment system but which is less certain in other contexts. It tends to lead to narrow specialization and obsolescence, avoided in Japan by the systematic rotation of employees and the equally systematic provision of upgrading training. It depends on the motivation of the trainees, and this is stimulated in Japan by competition of peers within the internal labor markets.

Not least, it depends on the firm already having in its employment workers who possess the skills in question and are willing to pass them on. In some countries the skills are scarce or deficient or both, and it is common to find that they become degraded over time because skilled workers are unwilling to create competition by training to their own level. The Japanese example is exceptional in this respect: training is an important function of the foreman, who "is expected to perform a teaching role; indeed, his authority depends on his success in that role." (Hayes, Anderson and Fonda, 1984).

In countries other than Japan, and for most occupations requiring significant skills, the relevant issue is not whether to provide a center-based element, but at what point in the trainee's career to provide it, how to effect a division of labor between the employer and the center in terms of the trainee's time and the training curriculum, how to design the centers themselves, and how to give employers incentives to make use of them (this last issue is discussed in Dougherty and Tan, 1987).

The answer to the first question differs from occupation to occupation. There is a near-universal emphasis on initial training, in the form of induction training, or, for those occupations which require extended training, apprenticeships, for the simple reason that the earlier the investment is undertaken, the greater is the benefit to both the individual and society.

With regard to the allocation of the trainee's time to training, the main constraint is his absorptive capacity, and this no doubt accounts for the popularity of day-release in many apprenticeship systems. There is considerable agreement that it is desirable to modularize extended training both because, used properly, it can improve the quality and reduce the cost of developing and updating training materials, and because it increases the flexibility of training.

Economies of scale appear to be the dominant determinant of the division of the curriculum between employer and center. As a general rule, center-based training becomes increasingly cost-effective and on-the-job training decreasingly cost effective, the greater is the volume of training, but the cross-over point depends sensitively on the occupation in question, the context of the operation, the prior general education of the trainees, and other factors (Evans, Holter and Stern, 1976). With regard to the design of training centers, the crucial aspects are their adaptability and economies of scale. Adaptability is enhanced by designing buildings with flexible space utilization, avoiding investment in expensive equipment, and recruiting instructors part-time from industry or on fixed term secondments from industry. Economies of scale can be maintained by the simple expedient of using external training provision where this is cheaper than costly, small-scale courses.

9.7 Employer-sponsorship versus center-sponsorship

In principle mixed employer and center based training can either be sponsored by the employer or by the center. In the first case the trainee is almost invariably given the status of employee, perhaps subject to a special contract as in the case of apprentices. In the second his main attachment is to the training center and his secondment to an employer is temporary (but may lead to permanent employment later).

There appears to be a consensus in the literature that, in general, employer-sponsorship has decisive advantages:

- Drop-out rates attributable to poor selection are reduced.

- The risk that a trainee completing the training will not find a training-related placement is eliminated.
- The trainee tends to be more motivated to take advantage of the training.
- It is frequently difficult to find employers who are willing to provide work experience for center-sponsored courses, and when they do, they are likely to take the practice element less seriously than if the trainee had been an employee.
- The employer is more likely to take a constructive interest of the training provided by the center, for the same reason.
- The numbers trained are more closely related to employers' needs.

Nevertheless one can find many examples of full-time pre-employment center-based training. Sometimes it has been developed on the assumption that firms should not be expected to provide the corresponding training themselves. As Harbison (1961) long ago observed, and warned, "in many countries, employers take the position that it is the responsibility of educational institutions to provide the needed manpower of this type. This is a dangerous position." Dangerous, not only because of the evidence that employer-and-center based training is more cost-effective, but also because it may impose an intolerable burden on public expenditure.

In some instances, center-sponsorship is clearly a second-best practice, the institution in principle being restricted to the training of employer-sponsored individuals. One can find examples in Latin America.

A third and more serious argument for establishing pre-employment center-based training is the desirability of creating a trained labor force to attract investment, foreign or otherwise. But this externalities argument applies much more obviously to general manpower development, and perhaps, for certain types of industry, to its more technical strands, than to job-specific training. In other words, it is more of an argument for increasing the volume and the quality of the output of schools. To go further and attempt to produce a job-ready labor force is likely to be a more costly and less useful incentive than, say, the ad hoc provision of customized job-specific training when a particular need arises.

9.8 Dynamics of training provision

The discussion of the cost-effectiveness of alternative modes of training provision is generally conducted within a comparative statics framework which assumes that the context of the training does not change in any radical way. In such a world if a given mode of training is most cost-effective at any one moment for a given class of occupations, it is likely to remain so in the future. But in reality as the developing countries evolve

the context is not constant in the long term and this raises the issue of whether a given training mode may be cost-effective for a limited duration and then be dominated by another.

There is almost no literature addressed directly to this issue, but a micro-study of U.S. Air Force training is highly suggestive. Evans, Holter and Stern (1976) report that when new tasks are created, as in the introduction of a new weapons system, there is a predictable sequence of types of training. First, the suppliers are responsible for providing training under contract; then the Air Force establishes mobile units to disseminate the training using formal methods; next, formal residential courses are established; and finally much of the training is gradually transferred to the on-the-job mode.

In this example formal methods are initially chosen primarily to accelerate the dissemination of the training, but other considerations would also favor their utilization: the innovative nature of the skill development and the opportunity to take advantage of the economies of scale associated with a high volume of training.

The same considerations would favor the initial utilization of formal methods for innovative skill development in a civilian context, but one should be cautious about a literal transfer of the model. As has been seen in Section 8, much innovative skill development is provided by suppliers, partners in joint enterprises, and via other commercial links. Typically each individual intervention is on a small scale, but the cumulative effect of the interaction between skill development and industrial development can transform the labor force.

The South Korean experience is particularly instructive in this respect. Whether by accident or design, the acquisition of technological mastery may be summarized as a carefully-graduated learning-by-doing strategy with three key features. First, direct foreign investment apart, the introduction of new technology was heavily dependent on turnkey projects. These provided learning opportunities which allowed diminished future dependence: "In some industries, including synthetic resins and fibers, the first plants were often built on a turnkey basis and on a small scale, much smaller than either the size of the market or the size that would exhaust scale economies. Construction of the second and subsequent plants followed quickly with Korean engineers and technicians assuming an increasing role in project design and implementation, and at scales much closer to or equal to world scale." (Westphal, Rhee and Pursell, 1981, p. 48).

Second, the Koreans concentrated on efficient plant operation rather than on innovation in product or plant design. This reflected the comparative advantage of its workforce, which, though relatively well-educated, was lacking in basic engineering know-how (Westphal, Rhee and Pursell, 1981, p. 51).

Third, the early industrialization focussed on non-proprietary technology which could be generalized to other applications: "In industries for which process technology is not product-specific, mastery has frequently

led to the copying of foreign products as a means of enlarging technological capacity. The mechanical-engineering industries, among others, afford many examples; such processes as machining and casting, once learned through producing one item, can easily be applied in the production of other items." (Westphal, Rhee and Pursell, p. 47).

The growth record of the Korean manufacturing industry bears eloquent witness to the power of the interactive process formed by the subsequent gradual relaxation of these restrictions and the development of engineering skills.

9.9 The Cost-Effectiveness of Complexity

Manpower planning is a field which is highly susceptible to damaging oversimplification. One notorious troublespot concerns the desirability of making projections of manpower "requirements". Despite all the evidence, empirical as well as analytical, that such projections are neither practicable nor necessary for most occupations, there is still a widespread view that this is the main function of national manpower planning units. This view is held mainly, but not exclusively, by staff of such bodies in developing countries, and it reflects a combination of inexperience, unfamiliarity with the literature, and wishful thinking. The truth of the matter is that if a national unit is to make an effective contribution to the manpower sector it must first recognize the complexity of its task in terms of subject matter, activities and techniques.

The determination of training policy is a similar troublespot. The more inexperienced the manpower planner, the more likely he is to be seduced by simple-sounding solutions to training provision. The vocationalization of secondary schools, the construction of full-time industrial training institutes--these are measures whose conceptualization does not demand excessive agitation of the grey cells and whose implementation does not call for too much footwork outside the office. And the fact that they attract the attention of donor agencies adds to their charm, particularly when the hard currency component of the loan exceeds hard currency expenditure on the project. Admittedly in many cases these loans must one day be repaid, but not before the planner and his minister have moved on.

Institutionalized training projects are equally attractive to donor agencies in that their implementation is straightforward, supervision procedures are well-tested, and they maximize the movement of money.

Unfortunately, for both borrower and donor, there is a weight of evidence that cost-effectiveness involves the establishment of much more complex training arrangements. In particular, it appears that for many occupations job-readiness training is best provided by employers, either alone or in conjunction with part-time release to training centers, and this applies both to pre-employment and in-service training. This means that, instead of going it alone, the national planning unit (and the donor agency) must be reconciled to the messy business of forging links and entering into partnership with a widely-scattered private sector.

This section began by acknowledging the importance of initial conditions for shaping training policy, and by warning that it is often preferable to make existing arrangements work better than to attempt more radical improvements. Nevertheless, even if the starting-point cannot be altered, there is usually scope for modifying the direction and speed of change. If the vocationalization of secondary education is under way, there may be scope for altering its balance, reducing the share of the curriculum devoted to job-readiness training and increasing the share of generic technical education and basic education. Similarly, if full-time training institutes are already under construction, there may eventually be scope for using them for part-time training in employer and center-based schemes.

It is occasionally argued that in some countries the introduction of mixed employer and center-based arrangements would make excessive demands on scarce central management resources. But experience has shown that institutionalized training is also heavily management-dependent, more so than may appear at first sight, and certainly much more demanding than general education (Herschbach, 1985).

In many countries, however, financial constraints will be the overriding determinant of training policy: the public sector will simply not be able to afford to provide job-readiness training on any meaningful scale, any more than it has done in the past. Hopefully this will lead schools and training centers to concentrate on doing well what they do best.

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